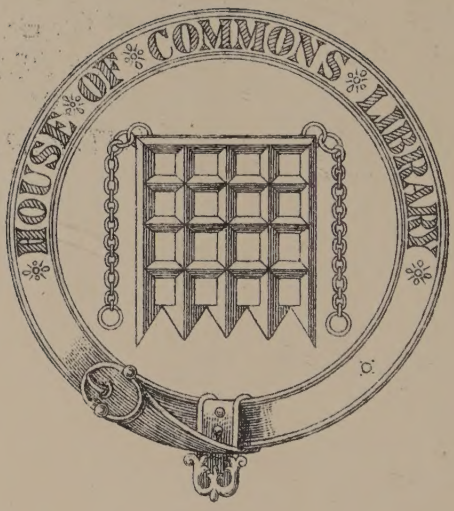
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A COTTON PLANTATION

Photograph by Ewing Galloway, N.Y.

THE ROMANCE
OF THE
COTTON INDUSTRY
IN ENGLAND

BY

L. S. WOOD, M.A.
Author, with G. W. Morris, of *The Golden Fleece* and *The English Speaking Nations*

AND

A. WILMORE, D.Sc., F.R.G.S.
Author of *The Groundwork of Modern Geography*, *Great Britain and Ireland*, *The British Empire*, etc.

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PREFACE

EACH of the great industries has its own literature ; but this, being for the most part expert or technical, is not designed for the ordinary reader. The present book, avoiding such technical detail, seeks to give to the general reader, as well as to those interested in England's industrial development and in the Cotton Industry itself, some idea of the part played by cotton in English history. It seeks to show how the Cotton Industry has thriven from the days when, like the Red Rose under whose auspices it flourishes, it was first grafted, weak and insignificant, on to the sturdiest industrial stem in England, the stem of the ancient Woollen Industry, to the days when, spanning the world from the western hemisphere, whence it drew its raw material, to the eastern, where it sold its finished produce, and, having concentrated within itself all the features of the Industrial Revolution in their most intense form, it provided England with the riches wherewith to pay for the second Hundred Years' War with France and to defeat Napoleon, even as its parent, the famous Woollen Industry, had provided her with the moneys to pay for the first ; and then to show how, from about 1830 onwards, it displays, as it were in microcosm, the changes that have befallen industry in England under the stress of international competition, and how it has given England Free Trade. In short, the aim of the present book is to depict the Cotton Industry in its setting as part of the history of England, rather than to isolate it for minute and detailed study.

The story of a great industry is a romance, in which may be traced the hopes and fears, achievements and failures of successive generations. Could the history of the great businesses be written, we should find few that were not actuated by many motives beside the primary one of profit-making. This plainly appears when a stray breeze, set in motion by some cardinal occurrence, lifts for a moment a curtain, as in Lancashire during the American Civil War, and affords a glimpse behind. But for the most part these great businesses are shrouded in silence, because they were built up and are maintained by men whose tradition it is not to talk.

It is this self-imposed silence that has consigned many a stirring deed to oblivion, and caused Industrial History, intimate as it is, to seem somewhat invertebrate in comparison with Political History, a thing of tendencies and statistics, lacking in

striking personalities. Whether this charge be in general just or not, it is not true of the history of the Cotton Industry, which can boast figures like those of Chetham, Arkwright, Peel, and even Lincoln himself to fill the niches of its temple-front. In this book such personal histories as rightly belong to the story of the Cotton Industry, and are suggested by its setting in Lancashire, have been introduced. Similarly it is hoped that the reader's ears may now and then catch the echo of a debate in the House of Commons or of the reply of a witness before a Royal Commission ; or listen to the comment of some observer or man of letters when he first heard the news of an event or development now famous. For History, even when clad in sober economic garb, is a thing of flesh and blood : old Proteus, though he may have put off a gay uniform for a fatigue dress, is no whit less vivacious now in Liverpool or Manchester than once in Rome or Antioch ;[1] and since it is by trade men live, that branch of history known as Industrial History should be second to none in inculcating the lesson of the essential brotherhood of man, and in giving men and women understanding of the ties that bind them in a common purpose. Whatever their industrial or political party, the study of it should help them to approach the vexed industrial and social questions of to-day in a frame of mind more humble, a temper more serene. For the study of History not only enlightens us about the past : it teaches inexorably that seldom in human affairs may not as much be said on one side as on the other, and that never is all the right on one side and all the wrong on the other. It is hardly too much to say that, in a democracy, widespread study of Industrial History is a matter of national importance. We shall not solve our industrial difficulties till we understand clearly how they have come to be what they are ; until we realise that they are matters of complexity and not of catchwords.

In the history of industry there are so many cross-currents, especially during the century of the Industrial Revolution, that, in writing it, it is difficult always to observe rigid chronological sequence. In each chapter those points have been dealt with which seemed properly to belong to the subject of the chapter : the authors have preferred the occasional repetition of a detail to absence of clearness.

We take this opportunity of thanking Mr. A. N. Wilmore for kindly undertaking the construction of the Index.

A. W.
L. S. W.

[1] Cf. Emerson's *Representative Men.*

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From Arkwright's own description of his machine quoted from Baines, *op. cit.*

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I

ENGLAND'S HERITAGE AS A TEXTILE COUNTRY

No long history of fame yet adds lustre to the cotton industry in England. Compared with the great woollen industry that was from early times the staple trade of the country, cotton is a mere upstart. Yet the story of cotton has its part in English industrial history since the early days of the seventeenth century. Cotton was used in the manufacture of cloths while Charles I yet sat on the throne, before the thunder of cannon reverberated not only around Lathom House, Wigan and Bolton in Lancashire, but up and down the kingdom. It was first Strafford and then William III who gave the great impetus to the Irish linen manufacture, upon which, till the age of the inventors, cotton weavers depended for their warp. But if cotton came late into the field, it found the ground prepared. England would not have taken up the manufacture of cotton with such zest, or achieved such signal and rapid success in it, had she not already a long and creditable record as a textile country. By the sixteenth century her woollen industry was so great that it seemed providential. It is the theme of two of our earliest 'novels.'[1] William Harrison, the continuator of Holinshed's *Chronicle,* declared that Jason would never have gone to Colchis in search of the Golden Fleece if he had known what English sheep could do. One seventeenth-century writer thought that God had exterminated the wolf in these islands with the especial purpose of guarding the sheep; another that He placed Fuller's-earth in our limestone hills to help the preparation of the wool. No doubt both were right. Providence—sometimes called 'geographical situation'—plays a large share in determining the occupations of a people, and

[1] Thomas Deloney's *The Pleasant History of Jack of Newbury* and *The Pleasant History of Thomas of Reading.*

England, small but centrally placed, is marked out by Destiny to be the home of seafarers and manufacturers.

Though from early times rough kinds of cloth were woven for home use, England began the building up of her woollen industry as a producer of the raw material. Geographical causes—the suitability of our downs and uplands for grazing and the comparative peace resulting from the fact of our being an island—

> ' set in the silver sea
> Which serves it in the office of a wall,
> Or as a moat defensive to a house,
> Against the envy of less happier lands '—

made England a good sheep-rearing country ; and our early connection with Flanders gave us a ready market.

This connection began with Alfred. After his victory at Ethandune the beaten Danes left England for a while and raided the Flemish coasts. After suffering several reverses Count Arnulf of Flanders defeated them at Louvain in 891. This drove them to try their fortunes once more in England, where in his last campaign, 892-896, Alfred broke to pieces their twice defeated but still formidable armies. The struggle against these invasions formed a bond between the two sides of the Channel. It had been more than a war of defence : not only was the safety of the two countries at stake, but the Vikings were heathens, and fighting them had assumed something of the glamour of a Crusade. Finally the comradeship in arms was cemented by a more romantic and lasting alliance : Alfred's daughter became the wife of the Flemish Count. Thus began that connection with the Low Countries which for centuries was the corner-stone of our trade and of our foreign policy.

The men of the Low Countries knew more of the textile arts than any other people in Europe, and, as the bonds between them and the English grew firmer, immigrants came over. Matilda, wife of William the Conqueror and designer of the famous Bayeux tapestry, was a Flemish princess, and attracted weavers of her former country to England. In 1108 a terrible inundation

THE BAYEUX TAPESTRY
The Coronation of Harold

of the sea submerged a great part of Flanders and a large number of Flemings asked Henry I to give them lands on which they might settle. He sent many of them to those parts of Wales which had recently been conquered by his barons or those of William Rufus. Such considerable settlements were made in the south-eastern part of Pembrokeshire and at Swansea, that George Borrow, travelling in Wales in 1854, declared that the people there still differed noticeably from the rest of the Welsh people. Other Flemings were settled in Northumbria. The habit of immigration thus begun under the Norman kings did not lapse. It forms a recurrent feature of our history right on to Elizabethan times, and had a marked and steady influence on our development into a people skilled in the textile industries.

Trade in the early Middle Ages was very local and isolated. Each little village or district was self-sufficing. With the exception of a few things like salt, it contrived to supply its own needs, and regarded the inhabitants of the next village as 'foreigners.' There was no uniform standard of weights and measures. The clause in Magna Charta enacting that there should be one was a pious aspiration for centuries to come. Nor was there the security that is necessary for even a steady trickle of commerce. Robin Hood is the outlaw whose name and fame have come down to us. But he is typical rather of our national spirit of adventure and our love of fair play than that of the class to which he belonged. He would not be the national hero he is had he not been a veritable prince among outlaws—a robber so magnanimous that he was hardly a robber at all. The peace which this island enjoyed under the Roman occupation—a peace typified by the great roads and the unfortified Roman villas—if not forgotten, was irretrievably lost, and was not recovered till a thousand years after the Romans had left Britain.

But the Normans and Plantagenets were strong rulers—and one after another they built up the structure of internal peace and order. Henry I exercised stern justice in England, and robbery received scant mercy at his hands. Henry II, with a strong right arm, put down the private war that had torn the

country asunder in the disastrous reign of Stephen, and ruling over half France as well as England, encouraged foreign merchants to come and go. There was another backsliding in the

A PARLIAMENT OF EDWARD I
showing the Woolsacks

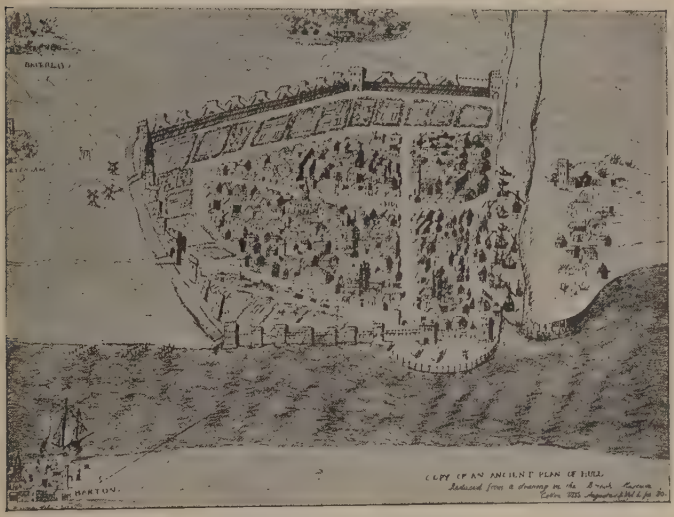
next reign; but Edward I, the English Justinian, gave England a code of laws that made trade between district and district possible. Henry II had destroyed the 'adulterine' castles that had been erected in Stephen's reign. Edward, by his anti-feudal statutes, broke the overgrown power of the barons. On imports the king had hitherto exacted pretty much what toll he

liked, and though the customs on exported wool and hides were supposed to be 'customary,' there was little safeguard against arbitrary exaction. By the Statute of Westminster (1275) the rate of 'Ancient Custom' was fixed—both for English merchants and for aliens (who paid 50 per cent. higher). Merchants thus knew where they were. The privilege was appreciated, and when the king tried to depart from his compact by imposing a higher duty the merchants made themselves heard so effectively that, being above all a just king, Edward acted in the spirit of his chosen motto—*Pactum serva* (Keep your promise)—and confirmed the charters (1297).

In other ways Edward I promoted trade. The twelfth century had been on both sides of the Channel marked by the growth of towns. Many of these towns had originally grown up round either a lord's stronghold or an abbey. As soon as these small settlements had grown sufficiently to feel their strength, they desired liberty (*i.e.* privileges), and those towns that had grown around some lord's stronghold found that the Crusades (which themselves were a great stimulus to trade) gave them an excellent opportunity. The lord needed money to equip himself and his retainers for the Holy Land: the towns were ready to supply money to enable him to do this in exchange for their liberties. Edward I officially 'recognised' the new-fledged towns in the Statute of Winchester (1285), which enacted that towns should be walled, that their gates should be shut at night, and made provision for the betterment of highways from one town to another. The promotion of trade was one of the chief objects of this provision: years previously the Statute of Acton Burnell had simplified the recovery of trade debts. The first English king to envisage a United Kingdom of England, Scotland and Wales was fully alive to the unifying influence of commerce and to the need of developing it.

Towns in the early Middle Ages managed their affairs by means of gilds. From the earliest period of the Middle Ages some form of gild had existed, representing on the secular side that idea of brotherhood which on the spiritual side the Church emphasised

THE CLOTHIERS' GILD HALL, LAVENHAM, SUFFOLK



A WALLED TOWN
An early plan of Hull

so far more widely. Many towns, as they gained independence, built up on these informal gilds a new kind of gild called the Merchant Gild. The Merchant Gild was at first open to all the townsmen, who were thus freemen of the town. In many cases the Merchant Gild was the governing body of the town; the various wards elected their aldermen: the assembled aldermen elected their reeve or mayor, much as is done now. Some of the old gild halls in which the mayor and aldermen did their business survive, as at Coventry, to this day. In many more towns the name survives, and the 'Guildhall' remains the centre of municipal life.

The members of the Merchant Gilds—being all freemen of the town—were of all trades. But as time passed matters became more complex and each trade developed its own special gild—its *Craft Gild*. The organisation was similar, but the objects were different. The Craft Gild was concerned not with the town in general but with the particular craft, with looking after its various members, keeping up the standard of workmanship, and to this end providing well-trained apprentices to carry on the 'mistery' (mastery) of the craft.

The first craft to have its craft gilds was weaving. The textile industry in London was sufficiently developed to be granted by Henry I its own Weavers' Craft Gild in 1100. The Great Cloth Fair that was held in the Churchyard of St. Bartholomew's Church dates from Henry II's reign, and in the twelfth century weavers' gilds, with privileges similar to those granted by Henry I to the weavers of London, arose in Nottingham, Oxford, York, Lincoln and Winchester—the town where the Romans had had their depot for the clothing of their armies in Britain.

The gilds—save in so far as they were organisations of workmen and were, among other things, benefit societies—have little in common with modern Trade Unions, but they are important because they form part of our national habit of thought. The student of more recent industrial history finds the seventeenth, eighteenth, and even the nineteenth century strewn with the debris of mediaeval forms and institutions. We still present

distinguished persons with the freedom of a town, as the highest compliment we can offer them. Our University course is still framed exactly upon the grades of the old craft gild—the undergraduates are the apprentices, the Bachelors of Arts are the journeymen, and these in theory only proceed in due course to full membership of the University by presenting their 'masterpiece,' for which they are rewarded by the M.A. degree. We are

SEAL OF HASTINGS
The ship is flying the banners of the Cinque Ports and of England

proud that in England old things die hard. But there are sometimes drawbacks. As late as 1795 no one could set up in business in York without buying the freedom of the city, and, as this was an expensive matter, York had little trade.

Most of the shipping of English goods in the thirteenth and fourteenth centuries was in the hands of foreigners. But as the cloth industry grew, English shipping developed. Edward I gave a considerable impetus to it by fostering the Cinque Ports, which in return supplied him with ships to act as his Army Service Corps in his campaigns against the Welsh and the Scots. Under Edward III further advance was made. The Hundred Years' War began with the naval victory of Sluys in 1340. This

victory was a just and proper retaliation for the French king's action—recorded by the gallant courtier Froissart—of the previous year, in fortifying his navy with a great retinue of Genoese, Normans, Bretons and Picards who 'did that year great damage to the realm of England.' The fact that the taking by the French of 'a great ship called the *Christopher*, laden with wools, as she was going into Flanders' is specially recorded is evidence of the existence of a busy trade with that country.

It is also evidence of something else—the existence of piracy in the Channel. Edward avenged the French king's piratical raids of 1339 at Sluys. Ten years later he gave a wholesome lesson to the Spaniards and Basques, at the picturesque battle of *Lespagnols-sur-Mer*, where fought the flower of the chivalry of England, led by the Black Prince, Sir John Chandos and Edward himself. Like their compeers of three centuries later, Blake and Prince Rupert, they seem to have been as much at home on the quarter-deck as in the saddle, though the professional seamen, of whom Chaucer has told us a definite class was growing up, could not make the same boast. Chaucer's Shipman

> . . . rood up-on a rouncy,[1] as he couthe
> In a gowne of falding[2] to the knee.

But though he rode like a sailor he knew his job :

> He knew wel alle the havenes, as they were,
> From Gootlond[3] to the Cape of Finistere,
> And every cryke in Britayne and in Spayne ;

and he did not lose his head when he fell in with pirates :

> If that he faught, and hadde the hyer hond
> By water he sente hem hoom to every lond.

Edward, not without justification, styled himself 'Avenger of Merchants'. He even sought to give protection to traders at sea by a system of convoys. But right on to the time of Shakespeare piracy remained a serious menace and hindered expansion of trade.

[1] A common hackney horse. [2] Coarse cloth. [3] Gottland.

The development of the textile industry in these islands owes another debt to Edward III. Simon de Montfort had urged that English wool should be manufactured into cloth at home, and had encouraged foreigners who would teach Englishmen the finer and more skilled processes to come over and settle. Edward III developed the idea, so that in his reign it became something of a policy. Like William the Conqueror he had the advantage of being married to a Flemish princess, the popular Philippa of Hainault. The wars on the Continent made the more timid not unwilling to adopt their princess' new country as their own. It was at this time that the famous John Kempe came to Norwich and afterwards went to Westmorland, founding the manufacture of the famous Kendal Green. Linen weavers as well as woollen weavers came, so did silk-workers, and even three clock-makers from Delft. In 1337 a general invitation, with promise of protection, was given to all weavers who would come.

Other forces were at work. In 1348 came the terrible scourge known as the Black Death. At a moderate estimate it is supposed to have carried off a third of the population, which in days before sanitation was heard of is not unlikely. It certainly stopped the war with France, and we learn from Langland's *Piers Plowman* that children suddenly became so precious that there was a danger of their being spoilt.

From the point of view of industry and commerce the important thing about the Black Death is that it broke up the system of English rural life—what is called the Manorial system. Not only were there not so many men and women to cultivate the land as of yore, but even if it had been cultivated there would not have been enough mouths to eat the produce. But the country held trump cards in its woollen industry, and these cards it proceeded to play. Land that had formerly been cultivated became pasture and more and more sheep were reared. Much of the wool was exported, but an increasing amount of it was turned into cloth at home. The changes were not accomplished without much hardship and discontent. Edward III's reign ended in comparative gloom, and under his grandson and

successor came the well-organised Peasants' Revolt. The name of one of the leaders of the revolt, Geoffrey Litster (= Dyer), shows that the textile workers were well represented. The abolition of villeinage, and of certain tolls and taxes, and land at 4d. an acre, were some of the demands. But there was far more than that in the revolt, which remains, like the character of John of Gaunt,

RURAL LIFE

the character of Richard himself, and the meaning of the quarrel between the Earls of Hereford and Norfolk, one of the unsolved problems of the reign.

The fifteenth century was a century of contrasts. Langland in his *Vision of Piers Plowman* gives a depressing picture of rural life. On the other hand Chaucer, the first English writer to get away from the clerical manner of looking at things, paints a prosperous England and a community pretty well organised commercially. In his portrait gallery of Canterbury pilgrims, besides the merchant and the haberdasher,

> A Webbe, a Dyere and a Tapicer,
> Were with us eek, clothed in o liveree,
> Of a solempne and greet fraternitee.

Chaucer, too, bears witness to the growing trade with Flanders in textiles. The merchant wore 'a Flaundrish bever hat'. The Frankeleyn had 'a wallet al of silk', and the Sergeant of Lawe a silken girdle, albeit he

rode but hoomly in a medlee cote.

The Knight, like Sir Roger de Coverley of later date, dressed plainly in home-made stuffs :

Of fustian he wered a gipoun.[1]

and the Yeoman wore a 'cote and hood of grene'—possibly the famous 'Kendal Green'. But there was nothing homely about the Friar :

. . . he was lyk a maister or a pope,
Of double worsted was his semi-cope.

The stars of the party, however, were the young Squyer,

Embrouded was he, as it were a mede
Al ful of fresshé flourés, whyte and rede,

and the Wife of Bath :

Hir coverchiefs ful fyne were of ground ;
I dorsté swere they weyeden ten pound
That on a Sonday were upon her heed.
Her hosen weren of fyn scarlet reed.

Glories like these speak of the looms and dyevats of Flanders. English textile workers were not as yet capable of creating them.

The buildings that were being erected in the fourteenth and fifteenth centuries stand as witnesses to-day of the truth of Chaucer's picture. While Piers Plowman was ploughing his furrow in a coat of threadbare home-spun cloth, called carry-marry, and the ribs of his oxen could be counted through their hides, in the woollen districts were rising those splendid perpendicular churches which are still national monuments—churches like Gloucester Cathedral, Cullompton in Devon, Fairford, Chipping

[1] A short doublet.

Campden and Northleach in Gloucestershire, Salisbury Cathedral, Wymondham, Lynn, Lavenham and Long Melford in East Anglia, Bradford, Halifax and Skipton in Yorkshire, and, a little later, Manchester Cathedral. Churches stand longer than private dwellings, but it is possible to point to many of these also. There is Stokesay Castle built by the cloth merchant Lawrence of

STOKESAY CASTLE

Ludlow, the Hall of John Hall the woolstapler at Salisbury, Greville's house at Chipping Campden, Shibden Hall, the home of the Listers, near Halifax, Paycocke's house at Coggleshall in Essex, as well as rows of weavers' houses, as at Steeple Ashton in Wiltshire.

The growth of our shipping is another proof that our manufacture of cloth at home was expanding rapidly. When a nation's trade is small there is no particular motive to develop its shipping, but when manufactures develop beyond the needs of home consumption, markets have to be found for them. The first charter of the Merchant Adventurers dates from 1407, but they were

SOUTH PORCH, GLOUCESTER CATHEDRAL

NORTHLEACH CHURCH

almost certainly in existence earlier. Gradually English sailors drove their foreign rivals, the Hansards, members of a great league of German and Baltic towns known as the Hanse League, from English ports, till by Elizabeth's reign only English bottoms had the honour of carrying English cloth.

The brightest spot in the fifteenth and early sixteenth century was the woollen industry. The stability of society had been rudely upset by the Black Death and its consequences. The disastrous last years of the Hundred Years' War and the weak rule of Henry VI no doubt justified the comment of John Holland to George Bevis : [1]

> *George.* I tell thee, Jack Cade, the clothier, means to dress the commonwealth, and turn it, and set a new nap upon it.
>
> *John.* So he had need, for 'tis threadbare.

If the effect of the Wars of the Roses—in which no town stood a siege—has been exaggerated, the constant changes at the helm must have been embarrassing, and the upset to trade considerable. Demands for money harassed the towns, which were beginning to suffer through the over-organisation of the gilds, whose heavy 'taxation' and over-regulation depressed industry. But as a whole the wool trade was undoubtedly flourishing, and the growing demand for English cloth, which caused more and more land to be enclosed for sheep-rearing, also provided employment for the displaced labourer. In 1348, at the moment of the Black Death, the subsidy on wool exported to Calais amounted to £68,000. A century later (1448) it had dropped to £12,000. On the other hand, whereas in 1348 the total export of English cloths was not more than 5000, by 1500 it had risen to above 80,000. The workers of Bruges and Ypres paid the price of this advance : the 40,000 looms which Bruges had boasted in the thirteenth century had sunk to a mere handful, and Ypres had suffered similarly if less severely. By the middle of the fifteenth century the English Government were adopting a definitely 'protectionist' policy, that is, were trying by their laws to

[1] 2 *King Henry VI*, Act 4, Sc. 2.

THE CLOTH HALL, YPRES

protect home industries. In 1463 the importation of woollen cloth and woollen caps was forbidden.

How widespread over the country was the making of cloths for export is shown by the Aulnager's returns.[1] Yorkshire, Suffolk, Gloucestershire, Somerset and Wilts each produced over 4000 cloths a year, Essex came next with over 2000, Berks, Devon, Hants, Kent, and Warwick made between 1000 and 2000. But the point is that there was hardly a county in which some cloths were not made for export. The fact that there were no returns for Cumberland, Durham, Westmorland, Cheshire and Lancashire means that in these counties cloth was made only for domestic consumption, or was so coarse that it was exempt from subsidy; and the low position of Norfolk on the list—it produced under 1000 woollen cloths per annum—may be taken as pointing to the fact that it was already devoting its attention to worsteds, which were exempt from subsidy.

The sixteenth century brought fresh troubles in its train. The promise of settled government, which the nation enjoyed under the able rule of Henry VII, when trade prospered, was upset by the Reformation. The dissolution of the monasteries meant the extinction of the machinery that had hitherto relieved distress. Towns where great religious foundations stood, like Coventry and Beverley, suffered acutely. Indeed, the dislocation that must have followed upon the dissolution is not easy to imagine; for at a moderate estimate one-fifth of the land of England changed hands.

If we may judge from the despondent tone of *Utopia* all was not well with society in Henry VIII's reign. Enclosures were blamed, and Royal Commissions were appointed to look into them. As the century advanced and the precious metals began

[1] The Aulnager (Lat. *ulna* = an ell, or yard) was an official appointed by the Government to inspect, measure, seal and register cloths intended for export, with a view not only to the assessment and collection of subsidy, but also of maintaining the standard of work. Like others of His Majesty's Inspectors he was not popular, and the second aspect of his duties was especially resented.

to be brought to Europe from the New World, prices rose, without any commensurate rise in wages to redress the balance. But this was not understood. New trades like glass-making and others, consequent on the invention of printing and of the lathe, were springing up. There were even attempts at setting up industries in something resembling a modern factory, and the decay of towns became a matter of concern. The town weavers feared ruin to their industry—and petitioned against the setting-up of divers looms in the clothiers' houses, 'and keeping and maintaining them by journeymen and persons unskilful, to the decay of a great number of artificers which were brought up in the science of weaving', with the result that in the Weavers' Act of 1555 it was laid down that clothiers dwelling outside a corporate or market town might not keep in their houses more than one loom at one time, or profit by letting looms. Nor might fullers keep a loom, nor weavers act as fullers or as dyers; each trade was to mind its own business. Machinery was discouraged; gig machines—cylinders covered with teasels for raising a nap on cloth—were forbidden in 1552, William Lee's stocking machines in 1589.[1] Traditional skill was to be preserved and unemployment guarded against.

But Acts of Parliament can do little to stop general tendencies. The collection of carders, spinners and weavers under one roof —as was done by the famous Jack of Newbury and attempted by a rich clothier named Stump—was indeed checked. But employers such as they none the less gradually got control of industry. From this time dates the beginning of the Domestic System, under which industry was carried on in the homes of the workers, who cultivated their farmsteads and kept their cow, pigs and poultry. Some were their own masters, as in the West Riding up to Defoe's time. Others, especially in Somerset, Wilts,

[1] The inventor, William Lee, of St. John's College, Cambridge, had the experience of later textile inventors in being driven by discouragement at home to seek sympathy in France. His frames were encouraged at Rouen, and they seem to have got thence to Nottingham before Lee died at Paris in 1610.

and Gloucestershire, worked for ' clothiers ', men owning capital who handed out the raw material and took the product. Many causes led to this result. In the fifteenth century there had been a desire to break away from the restrictions of the gilds. An expanding market, vigorously pushed by the Merchant Adventurers and the Eastland Merchants, demanded new methods of industry. In some towns food was dear. In 1561 the flitting of the old industry of York westwards to the villages of Leeds, Wakefield and Halifax, was attributed by one living in York at the time to the fact that the ' poore folkes, as spinners, carders and other necessary worke-folkes for the said webbing ', could in the open countryside have ' rye, fyre and other releif good cheape, which in this city is very dear and wanting '. Like other older towns, York was clearly suffering. In 1548 the woollen weavers and the linen weavers had amalgamated and formed one company, ' the Weavers' Company of York ', which lasted for 250 years. In the same year in the West it was complained that farmers were becoming clothiers, which shows that the textile industry was spreading into the agricultural districts and the two trades being carried on by the same people.

But though towns were depressed and prices rising it was a ' Merrie England '. The poet Drayton has described for us the Shepherds' Games on the famous Dover's cliff at Chipping Campden, in which local tradition has it that Shakespeare took part. The shepherd himself, in his long white cloak, with a deep cape made of the ' locks of the sheep ', coming half-way down his back, equipped with his sheep-crook, his sling or scrip, his iron tar-box,[1] his pipe or his flute, and his dog, differed little from ' Jolly, jolly Wat ' of the fifteenth century carol.

> The shepherd upon a hill he sat ;
> He had on him his tabard and his hat,
> His tar-box, his pipe and his flagat [2] —
> His name was called Jolly Jolly Wat,

[1] Tar was used to check and cure the disease known as ' scab '.

[2] *i.e.* flagon.

For he was a good herdés boy,
Ut hoy,
For in his pipe he made so much joy.

The spinners had their festival of St. Distaff's Day on the morrow after Twelfth Night. The custom was alive in Herrick's time and he has preserved it for us :

Partly work and partly play,
You must on Saint Distaff's Day :
From the plough soon free your team ;
Then come home and fother them.
If the maides a spinning goe
Burn the flaxe and fire the towe ;
Scorch their placquets, but beware
That ye singe no maiden haire.
Bring in pailes of water, then
Let the maides bewash the men.
Give Saint Distaff all the right,
Then give Christmas sport good-night ;
And next morning every one
To his own vocation.

Spinning was at this time a bye-occupation for all women. The *Book of Husbandry* (1540), while urging the good housewife to ' let the distaffe be always ready for a pastyme, that thou be not ydle ', admits that ' undoubted a woman cannot get her lyvinge honestly with spynninge on the distaffe, but it stoppeth a gap, and must nedes be had '.

Weavers have always had a reputation for being musical, and in a century which regarded music as the queen of the arts they must have seemed the best of good fellows. There is ample testimony to their prowess. In Ben Jonson's play, *The Silent Woman*, the parson takes cold ' with sitting up late and singing catches with cloth-workers '. Sir John Falstaff[1] vainly trying, after running away at Gadshill, to convince Prince Hal of his courage, exclaims in an injured tone, ' I would I were a weaver ! I could sing psalms and all manner of songs ', and Sir Toby Belch[2]

[1] *King Henry IV*, ii. 4. [2] *Twelfth Night.*

knew of a catch that 'would draw three souls out of one weaver'. Moreover, they were right good jovial fellows. For was not Bottom a weaver?

Possibly Falstaff's allusion to psalms is a sly hit at the many Calvinist refugees from the Low Countries who were being admitted into England as part of the government's 'policy of power'. Cecil was nursing the realm 'as if he were the steward of a private estate', and was ready to aid and encourage all who were prepared to work hard and loyally.[1] The idea was twofold. The country was to be self-supporting—able to make everything it needed and to grow all its food at home; and, for articles of commerce, it was to encourage those pursuits which either contributed to the strength of the nation, as for example the fishing industry which furnished trained sailors for the navy, or directly brought money into the country, as for example the manufacture of cloth which could be sold abroad. Foreigners were useful because they could teach new trades: it was a form of technical education. The persecution of Protestants in the Netherlands by the late Queen Mary's former husband, Philip II of Spain, and the wars of religion in France gave renewed impetus to Huguenot immigration. They came over in considerable numbers, and settlements were made at Canterbury, Sandwich,

A WEAVER
16th Century

[1]Cecil's saying of Sir Walter Raleigh, 'I know that he can toil terribly', throws a flood of light not only on Cecil himself, but on his times. 'God selleth all good things,' said Leonardo da Vinci, 'at the price of labour'; and the merriness of 'Merrie England' lay in her capacity for honest toil.

Maidstone, Colchester, Spitalfields, Manchester, Bolton, Saddleworth, and other places. They taught several new trades, such as glass-making; but it was the textile manufacture in wool, linen and silk that benefited chiefly. In 1569 the number of 'strangers' at Norwich, an old haunt of the Netherlanders, was reported by the mayor and aldermen to the Privy Council to be 2866. The object of the immigrants was to find religious toleration, and they found it at Norwich. Archbishop Parker, himself a native of Norwich, used his influence on their behalf, and the Bishop of Norwich, Dr. Parkhurst, had a fellow-feeling for them, for in Mary's reign he had himself known what it was to be a refugee. The Dutch service, still held once a year in the church of the Black Friars, is a survival from this time. The Dutch introduced the growing of root crops—but their main contribution was the setting-up of a linen industry and the introduction of the faculties of making 'arras, sayes, tapestry, mochadoes, stamets, carsay and such other outlandish (*i.e.* foreign) commodities as hath not been used to be made within this our realm of England'. So long as these new-fangled goods were made in England their sale did not withdraw money from the country and the Government blessed them. In 1578 Queen Elizabeth herself visited Norwich. The principal show prepared for her entertainment was the Artisans' Pageant. The great stage was adorned with paintings of looms representing the weaving of worsteds, runels, mochadoes and lace. At either end were girls spinning and knitting worsted yarns, and although the queen had listened to several speeches and was tired, she was woman enough to take evident delight in this little pageant, examining both the work in progress and the varieties of weaving shown by means of the painted looms.

Newfangledness was a marked feature of the Elizabethan age. Men were ever ready to listen to

> Report of fashions in proud Italy,
> Whose manners still our tardy apish nation
> Limps after, in base imitation.[1]

[1] *King Richard II*, ii. 1.

Not only did young men seek their fortunes, and even, like Portia's 'Falconbridge, the young baron of England', their clothes abroad, but the staid weavers of Halifax 'despised their old fashions if they could hear of a new, rather affecting novelties than allied to old ceremonies.'[1] The craze for novelty spread. A few decades later the Civil Wars had their effect on fashions, by causing many an Englishman who had never been more than ten miles from his own door to travel about the country. Writing a few years later, John Evelyn records that the very shepherds had abandoned the habit of wearing 'straw-hattes', while the shepherdesses, like the little minxes they were, were going *à la mode* and beginning to work point, 'whereas before they did only knitt coarse stockings'. The way was open for the new calicoes and muslins that the East India Company was beginning to bring from the East, and for those new stuffs that were being made at home—especially the stuffs made out of a substance, which was already being imported but of which the manifold uses were as yet undreamed of—a substance called cotton.

II

THE OBSCURE BEGINNINGS OF THE COTTON INDUSTRY IN ENGLAND

'Truth,' said the wise man, 'must be content to wait. She is used to it'. He was probably thinking, among other things, of the early history of the cotton industry in England. At all events it is shrouded in mystery. Not only are the early records scanty, but there is even uncertainty as to the meaning of the terms. Were the 'cottons', for which Manchester and Dunster were early famous,[2] cloths with some admixture of cotton in

[1] Ryder's *Commendations of Yorkshire* addressed to Lord Burleigh, 1588.

[2] Also the 'Bristol Cotton', a striped cloth with a long nap that could be resheared when the garment grew shabby, which was made at Bridgwater and Taunton.

THE HILLS AROUND GRANADA

them, or were they merely a species of woollen cloths like the Dozens, Kerseys, Penistones, Friezes, and Half-Thicks beside which they are named? A Statute of Henry VIII's reign seems to settle this point by referring to 'frising' in relation to these 'cottons', for 'frising' is a process peculiar to woollen cloths.[1] Again, what was the early significance of fustian? It is one of those words that entered Europe through the Genoese trade and it is of Arabic origin. But did it at first—*e.g.* in Chaucer's Prologue—mean simply a coarse kind of cloth? If so, when did it begin to assume a technical significance?[2]

Cotton was very early used for clothing in Egypt and in the East, though it did not penetrate into China till the fourteenth century. But the remarkable thing is that it was manufactured and was grown in Europe from the tenth century. This was in Moorish Spain under Abderahman the Great (912-961). It was cultivated on the plains of Valencia, where it still grows wild, and manufactured at Seville, Granada and Cordova. But while under the Moors, Southern Spain, though in Europe, was not of it. Christian Europe was a self-contained community, which, although its members might wage domestic wars with one another, was on the defensive and therefore united against all non-Christians. Trade with the Mohammedan East in spices there had to be—for how could one eat salted meat without them?—but Mohammedans on European soil were another matter. And thus it came about that when the merchants of Genoa and Venice did trade with the Mohammedans for cotton, they went East for it to the towns

[1] Baines, *History of the Cotton Manufacture*, p. 92 *seq.*

[2] In the *Victoria County History of Lancashire*, ii. p. 296, it is stated that 'the manufacture of "fustians", a mixture of wool and linen, and subsequently styled "cottons", was in existence in the neighbourhood of Manchester at the close of the fifteenth century. The identification of fustians with cottons at this early date is tempting, and would explain much, but it does not seem to be warranted by available evidence. As far as such evidence goes, it appears that the beginning of the fustian-manufacture has to be sought in the industrial changes of the second half of the sixteenth century, and that, in England, fustians made partly of cotton were a species of the "new drapery".'

An old engraving giving a perspective of Venice and her waterways

that had been conquered by the Crusaders, and not West to those cities where it was actually being manufactured within the boundaries of Europe itself.

The Spaniards, who for eight centuries rubbed shoulders with the Moors without learning their trade secrets, had a second opportunity of introducing the use of cotton, when their sailors discovered and penetrated into America. Columbus had found the inhabitants of Hispaniola wearing cotton dresses, Magellan saw the Brazilians sleeping in nets of cotton, called hamaks, and among the presents sent to Charles V by Cortez were cotton mantles, waistcoats, counterpanes, and tapestries and carpets of cotton. But Spain had no genius for commerce; she neither imitated the process nor sought to import the raw material.

Some kind of cotton manufacture—principally light sail cloth and fustians—appears to have existed in Barcelona from the thirteenth century, and the names of two streets still commemorate it. In the fourteenth century fustians and dimities were being made at Venice and Milan, with a linen warp and cotton weft, as afterwards in England. Thence the manufacture spread to Germany. There was an early centre at Ulm, and another at Augsburg, where the famous Fugger family laid the foundations of its wealth by weaving a fabric of linen and cotton known as Barchent. From Germany the manufacture of fustians spread to Antwerp and Bruges, as we learn from Guicciardini, an Italian who wrote an account of the Low Countries in the time of Queen Elizabeth. Of those days Antwerp was the Manchester, the cotton manufacturing centre, while Venice was the Liverpool, the market for raw cotton.

When the fifteenth century opened, cotton had been for two hundred years an ordinary article of import. It figures regularly in the customs of various ports. As early as 1303-4, before Bannockburn and Crecy, it was being shipped into Boston, Ipswich and Sandwich, and the duty was 2d. a sack.[1] A century later, on 29th August, 1402, a ship belonging to John Brown [2]

[1] Gras, *The Early English Customs System*, 1918, pp. 119, 161 and 167.
[2] *Ibid.* pp. 553-5.

brought three bales of cotton-wool to Lynn; the rest of the cargo comprised onions (for which the Norfolk people seem to have had a remarkable appetite), alum and soap. On the 5th September a ship of Danyel Johannesson, laden with a similar cargo, brought two bales of cotton valued at £10. On November 26th, 1420, John Pott, on landing a mixed shipment consisting of a barrel of tin plates, fifteen rolls of cotton and diverse haberdashery, paid over to Henry V's comptroller, Richard Huchons, the sum of £5 6s. 8d. Southampton was importing cotton, as well as haberdashery and old feather-beds, in 1443-4. On the 8th February, 1504, the *Joost de Dordright* (Christian Williamson, Master) sailed into Lynn with a cargo of paving tiles, herrings, brewing pans, copper kettles and feather beds. She brought also forty yards of cotton, which had to pay a duty of twenty shillings. She left on 1st March carrying coal and oats.[1]

A book of Rates was drawn up at the Port of London on the 'xv daye of July xxii yere of the rayne of ower Soverayne Lord Kynge Hary the VIIth (1507), the same to induer and to contynew for ever duryng the Kyngs pleasure'.[2] It is a rough list, but makes an attempt at order by way of alphabetical arrangement. Under C it has the following entries:

'Cottons for wymen the pece XXd
Cotton wolle the C weyght XXVIs. VIIId
Cotton wolle spowne the C weyght XXXIIIs. IIIId'

It is difficult to believe, even in respect of such an enlightened nation as we are, that all this cotton was used for candle-wicks, as used to be supposed; especially as linen does quite well for that purpose, and was so employed even in the days of Tutankhamen.

An account of John Heron, comptroller of customs, covering the period 21st April—the day on which Henry VII died, to 21st June, 1509, shows that 'old cotton' was then being imported into London. But the striking thing in this return is the constant and extensive export, both by aliens and denizens, of cotton-

[1] Gras, *The Early English Customs System*, 1918, pp. 656-9.
[2] *Ibid.* pp. 694 *seq.*

russet. Cotton-russet occurs over and over again, in company with kerseys, white-cloths, cloths without grain, 'north' cloths, scarlets, friezes, linens and worsted-duplex. Like them it was packed for the most part in fardels. There is nothing to suggest that it differed from them in being an import re-exported. Its presence on page after page of Heron's return, in the first weeks of the reign of Henry VIII, needs explanation.[1]

A Statute of Henry VII's, dated 1496, affords evidence that imported fustians made partly of cotton were sheared over here. A century later (1597), under his grand-daughter, this Statute was re-enacted; but this time nothing is said about the fustians being imported, and the inference is that they were made over here.

The zeal of the Tudors, and especially of Queen Elizabeth, to make England self-sufficing by the introduction of new trades, is well known. Her Minister Cecil, as has been said, nursed the realm as though he were the steward of a private estate.[2] William Browne of Tavistock bears witness in *Britannia's Pastorals* to the zeal and enterprise of the dyers. Browne laments the change from the good old times:

> The bowels of our Mother were not ript
> For Madder-pits, nor the sweet meadows stript
> Of their choice beauties, nor for Ceres' load
> The fertile lands burd'ned with needless woad.
> Through the wide seas no wingèd pine did go
> To lands unknown for staining indigo;
> Nor men in scorching climates moor'd their keel
> To traffick for the costly cochineal.
> Unknown was then the Phrygian brodery,
> The Tyrian purple, and the scarlet dye;
> Such as their sheep clad, such they wove and wore,
> Russet or white, or those mixt, and no more:
> Except sometimes (to bravery inclined)
> They dyed them yellow caps with alder rind.

[1] The *probable* explanation, of course, is that, like the Dunster, Taunton and Manchester 'Cottons', this Cotton-russet was a species of woollen cloth.

[2] See Chapter I, p. 22.

A CLOTH SHEARER
From the cloth-workers' window at Samur, 14th Century

DYERS
15th Century

Similar zeal for development and extension is to be seen in the orders issued to the Levant Company, established in 1582 as the result of a commercial treaty with Turkey. A commission was sent to Constantinople for the purpose of learning any secrets of manufacturing and dyeing, and instructions of a detailed kind were drawn up for their guidance by Richard Hakluyt, cousin of the writer of the famous *Voyages*. 'If you shall find', they were told, 'that they make any cloth of any kind that is not made in this realm, that is there of great use, then to bring into this realm some mowsters, that our people may fall into the trade and prepare the same for Turkey'.

It amounts then to this, that there is little evidence of the use of cotton in the manufacture of cloths in England before the later part of Elizabeth's reign. Even if it was used, the absence of all mention of it among the occupations set out in the Poor Laws as suitable for the occupants of work-houses proves that its use was hardly known, for the spinning of wool, flax, and hemp is mentioned.

Yet before the end of Mary's reign (1554) Norwich was manufacturing worsteds in which wool was not the sole ingredient. Satins, satin reverses, and fustians of Naples (called thereafter Norwich satins and Norwich fustians) were being made, and the manufacture of bombazines dates from the same time.[1] It is not easy to determine what these fabrics were, but Naples was noted for the luxury of its dress, and light fabrics they must have been. Norwich was striving after some new thing to restore its prosperity after the losses sustained from the effects of the dissolution of the monasteries—which dealt many textile towns, notably Coventry and Beverley, grievous blows—and from Tanner Ket's Rebellion in 1549, when 'a number of rascals and naughty lewd persons stole out of the city of Norwich and went to camp'; and its opportunity came through a calamity of European importance. His most Catholic Majesty King Philip II of Spain could not brook the Protestantism of his Dutch subjects in the Low Countries. The persecutions of his lieutenant, the

[1] John James, *History of the Worsted Manufacture in England*, p. 102.

Duke of Alva, drove them to an heroic resistance. The English Queen unofficially, and the English nation undisguisedly, sympathised with them. Drake was a ship-boy on one of the cross-channel boats that traded between the Medway and Holland

PHILIP II OF SPAIN

during Alva's administration, and unstintingly did he avenge the wrongs he then witnessed. Elizabeth offered homes in these islands to those of the victims whom the Spanish persecution rendered homeless, and the English textile industry reaped the benefit. Norwich in 1565 petitioned for some of the refugees. It had powerful friends at court—the Duke of Norfolk and Elizabeth's first Archbishop, Parker, who was a Norwich man. The petition was granted and the order was sealed for 'therty Douchemen of the lowe countries' and six 'Walowne masters', with their several households and servants not exceeding ten in

each family. Their names have come down to us. One can picture them as they paused on Mousehold, looking down on their new home, which must have appeared to them a sanctuary, even as English cities have done since in recent years to refugees from Belgium, and proceeding over Tombland through Redwell Street to Strangers' Hall to receive the welcome of its then owner, Master Sotherton, the mayor.

Elizabeth's letters patent directed that they were to make 'bays, arras, says, tapestry, mockadoes, staments, carsey and such other outlandish commodities as had not been used to be made within the realm of England'. They improved the process of worsted manufacture by introducing silk and linen yarn. This is what is meant by the 'New Drapery', so called to distinguish it from the broad-cloths and kerseys which were the 'Old Drapery'. Says, staments, and carsey were old names, however, and even bays were not new if the famous distich of 1546 spake truth:

> 'Hops, reformation, bays and beer
> Came into England all in one year'.

Mochado was a stuff made in imitation of velvet. At that time it was probably made partly of silk. Bombazines also were made partly of silk.[1] In 1570 the Book of Drapery records the making of 'bayes, fustians of Naples, caungeantries, tufted mockadoes, curelles, and all other works mixed with silk, saietrie, or linen yarn'.[2]

In October, 1571, the foreigners in Norwich numbered nearly 4000.

Men of the Dutch Nation - - -	868
Men of the Walloon Nation - - -	203
Women of both - - - - -	1173
Children under fourteen - - - -	1681
	3925

[1] Gk. *βόμβυξ*. Lat. *Bombyx*, a silk worm. Bombycina, a silk fabric known to the Romans.

[2] Blomefield's *Norfolk*, vol. iii, p. 283; quoted in James' *History of the Worsted Industry*, p. 112.

Eleven years later the total was 4679, of whom 2193 were children, 1378 of them being born in England.[1]

There is no indication that cotton was yet used to any extent in these new draperies, though there is abundant evidence that silk and linen were. However, it is clear there were secrets which the makers were anxious to preserve. It was the custom for all cloths and stuffs sold in London to be exposed to view in Blackwell Hall. But the sellers of the new draperies broke away from this practice and sold their stuffs at their inns. In 1579 the Corporation of London protested, urging that these new inventions such as ' buffiner, mockado, and the like had grown much into use to the decay of the use of cloth '.

What were the secrets the Norwich manufacturers were anxious to keep we do not know, but in 1605 there is definite evidence that cotton was being used in some of the Norwich manufactures.

Bombazines appear to have been made sometimes of wool, sometimes of cotton.[2] On the 13th of May, 1605, Mr. Thomas Hyrne, mayor, Mr. Thomas Sotherton, elect mayor, and six others, ' beinge of the eight men appoynted for orders for the strangers assembled in the counsell chamber of the Guyldhall ' decreed ' That whereas the strangers of the Wallon congregation doe this daye present a cloth of new device called satten cotton or bumbazie, made part of sylke and part of cotton woll, to the vewe of the persons above named, who, upon consideracion thereof had, doe order that the said cloth shall be made of good stuff with out deceyt and shall conteyne in length xix elles one quarter Flemyshe accordinge to the measure of their Hall in Inglishe measure xiiii yardes one quarter. And if yt shall want anye thinge of that length then the maker to forfeet and paye vi d and if yt shall want of xix elles in length of Flemyshe measure to forfeet and paye xii d. And yf it shall want a quarter of xix

[1] James, *ibid.* p. 113.

[2] There is a petition to the Earl of Salisbury of the year 1610 (*State Papers Domestic*, lix. 5) against frauds committed in the manufacture of ' bombazene Cotton such as groweth in the land of Persia being no kind of wool '.

elles in the length to forfett and pay xviii d. And if in the length it shall want more, then the cloth to have a seale of leade fyxed to yt with the printe of the letter P and to be sould but for a remnant. And the said cloth to be measured uppon the lome shall hold in breadeth with the mochdoes and tenne reedes broder '[1]—and so on.

The first Statute against embezzlement in the worsted industry, an enactment of 1609, concerns itself with 'A trade of clothing, making of bayes, sayes and other cloths and stuffs made of wool, or *partly of wool*', and thus affords further evidence that other materials beside wool were being employed in the making of cloths.

Again in 1613 John May, a deputy aulnager,[2] in his 'A Declaration of the State of Clothing now used within this realm of England' complained of a species of the new drapery called perpetuanas. 'There are also bastard perpetuanas made of says milled, Manchester or Lancashire plains, in form of kersies, to the discredit of those sorts of goods. Fustians, another species of new drapery, are also deceivably made from want of good government that the trade is wholly discredited, and like to be entirely lost'—it is the cry of the official who felt his office to be slipping from him and was losing touch with his work through experiments and novelties which he did not understand how to deal with.

The refugees from the Low Countries had not confined themselves to Norwich. Many had gone to the western seat of the woollen industry. There were large settlements of them at Canterbury and Colchester, and many had found their way to Lancashire. The Manchester authorities encouraged them by allowing them for the sum of fourpence yearly to cut timber from the woods for making their looms and supplying their firing. Many settled at Bolton. They were even attracted by such an out-of-the-way village as Saddleworth—the village that claims to be the parent of Oldham. Captain Robert Radcliffe, an

[1] Book of Orders for Dutch and Walloon Strangers, Norwich.

[2] See Note on p. 18.

MARKET HALL WITH STALLS
15th Century

ancestor of the Saddleworth Radcliffes, served with the English Irregulars in the Netherlands, and while there took to himself the Huguenot Jean Mallalue as his servant. Both fought at Zutphen and were present, it is said, at the death of Sir Philip Sidney. Eventually Jean accompanied his master to Saddleworth, to find there others who could speak his native tongue, namely François le Mann and Jacques Tailleur. All three remained and became Englishmen. Le Mann's name still lives in Mann's Mill. Mallalue, after a wooing which must have been rather like the wooing Shakespeare depicts between Henry V and Princess Catherine of France, only the other way round, married fair Margaret Wrigley, the belle of Saddleworth, and one of their descendants built Frenches Mill.[1]

What happened in Saddleworth was happening in other Lancashire villages, and in 1621 a petition of ' divers merchants and citizens of London that use buying and selling of fustians made in England ' and of ' makers of the same fustians ' puts the existence of a considerable cotton manufacture in Lancashire beyond a doubt. ' About twenty years past divers people in this kingdom, but chiefly in the county of Lancaster, have found out the trade of making of the fustians, made of a kind of bombast or down, being a fruit of the earth growing upon little shrubs or bushes, brought into this kingdom by the Turkey merchants, from Smyrna, Cyprus, Acra, and Sydon, but commonly called cotton-wool ; and also of linen-yarn most part brought out of Scotland, and other some made in England, and no part of the same fustians of any wool at all, for which said bombast and yarn imported, his Majesty hath a great yearly sum of money for the custom and subsidy thereof. There is at least 40 thousand pieces of fustian of this kind yearly made in England, the subsidy to his Majesty of the materials for making of every piece coming to between 8d. and 10d. the piece ; and thousands of poor people set on working of these fustians. The right honourable Duke of Lennox in 11 of Jacobus, 1613, procured a patent from his Majesty of

[1] *Tales of a Pennine People* : A. J. Howcroft. Lee, Whitehead & Co., Oldham, 1923.

alnager of new draperies for 60 years, upon pretence that wool was converted into other sorts of commodities to the loss of customs and subsidies for wool transported beyond seas; and therein is inserted into his patent, searching and sealing, and subsidy for 80 several stuffs; and amongst the rest these fustians or other stuffs of this kind of cotton-wool and subsidy and a fee for the same, and forfeiture of 20s. for putting any to sale unsealed, the moiety of the same forfeiture to the said duke, and power thereby given to the duke or to his deputies, to enter any man's house, to search for any such stuffs and seize them till the forfeiture be paid; and if any resist such search to forfeit £10, and power thereby given to the lord treasurer or chancellor of the Exchequer, to make new ordinances or grant commissions for the aid of the duke and his officers in execution of their office'.[1]

The history of that famous Lancashire family, the Chethams, affords further evidence of the growth of the cotton manufacture. Fuller, writing in 1662, in the account of Humphrey Chetham (b. 1580) says:

> 'George, Humphrey, and Ralph (Chetham), embarked in the trade for which Manchester had for some time been distinguished, the chief branch of which was the manufacture of cottons. Bolton at that period was no less the market for *fustians*, which were brought thither from all parts of the surrounding country. Of these last especially the Chethams were the principal buyers, and the London market was chiefly supplied by them with those materials of apparel, *then in almost general use throughout the nation.* Humphrey Chetham, when high-sheriffe of this county, 1635, discharged the place with great honour; inasmuch that very good gentlemen, of birth and estate, did wear his cloth at the assize, to testifie their unfeigned affection to him'.

[1] This passage was unearthed by an American writer, W. H. Price (*Quarterly Journal of Economics*, vol. xx. p. 608, from *Petition and Parliamentary Matters*, 1620-21, in the London Guildhall Library). It is quoted in the *Victoria County History of Lancashire*, vol. ii. p. 380, and by Daniels in his *Early History of the Cotton Industry*.

A still clearer picture of the industry is given by Lewes Roberts [1] in 1641, the year of the execution of Strafford, the year before King Charles I unfurled his standard at Nottingham.

> ' The town of Manchester, in Lancashire, (says he) must be also herein remembered, and worthily for their encouragement commended, who buy the yarne of the Irish in great quantity, and weaving it returne the same againe in Linen into Ireland to sell ; neither doth the industry rest here, for they buy *cotton woole* in London, that comes first from Cyprus and Smyrna, and at home worke the same, and perfit it into *fustians*, *vermillions*, *dymities*, and other such stuffes ; and then returne it to London, where the same is vented and sold, and not seldome sent into forrain parts, who have means, at far easier termes, to provide themselves of the said first materials '.

The new industry was hard hit by the Civil War. On 15th July, 1642, James, Lord Strange, son of the Earl of Derby, tried to seize the magazine in Manchester for the Royalist cause. Manchester and Blackburn, and the great families round about, like the Birches and the Ashtons, and Bolton, the ' Geneva of Lancashire ', were for the Parliament, but the rest of the county for the most part followed Lord Derby. Lord Strange, having failed to seize the magazine, laid siege to Manchester at the end of September. But the Manchester men secured the services of a German veteran, John Rosworme, who had seen service on the Continent. His mud walls and stern methods of command won the day. The siege was raised after lasting but a week. Manchester was henceforth the headquarters of the Parliamentary forces in Lancashire—' the very London of these parts ', as Lord Strange (now just become, by his father's death, Lord Derby) styled it. A Royalist attack on Blackburn was foiled on Christmas Eve, 1642, and next month (Jan. 1643) Parliamentary troops

[1] Lewes Roberts, Merchant and Captain of the City of London : *The Treasure of Traffike, or a Discourse of Forraigne Trade, wherein is shewed the benefit and commoditie arising to a Common Wealth or Kingdome by the Skilfull Merchant, and a well-ordered Commerce and regular Traffike*, pp. 32 and 33.

THE SEVENTH EARL OF DERBY AND HIS WIFE
CHARLOTTE DE LA TREMOUILLE

From a portrait by Van Dyck

under Sir John Seaton captured Preston. Twice did Royalist attacks on Bolton fail, and Sir John Seaton drove Lord Derby from Wigan and captured Warrington. Meanwhile refugees from Yorkshire were flocking into Lancashire after the defeat of Fairfax at Atherton (or Adwalton) Moor. Joseph Lister, a Halifax boy of sixteen, after witnessing the sack of Bradford, made several journeys backwards and forwards to his employer, Mr. Sharpe, who had taken refuge at Colne. John Brearcliffe, a young apothecary, who had recorded in his diary for 3rd July, 1643, 'Monday, 1 clok morn, bradford taken, and I into Lancashire', went to Bury and improved the shining hour by wooing and wedding pretty Dorothy Meadowcroft. John Hodgson, who had been twice wounded at Tadcaster, and taken prisoner at Bradford, was released and fled to Rochdale. Mrs. Lister of Shibden was buried in Manchester. In fact the eastern towns of Lancashire were crowded with Roundhead refugees from the West Riding, where the Royalists were victorious.[1]

By 1644 the Roundheads had got possession of most of Lancashire, and siege was laid to Lord Derby's fortified mansion, Lathom House, near Ormskirk. His gallant Countess, Charlotte de la Tremouille, defended it for four months, though the shots fell into her bedroom, when the siege was raised by Prince Rupert. He passed like a firebrand through Shropshire and Cheshire, sacked Bolton, killing 1600 people in the streets, relieved Lathom and took Liverpool. Thence through Skipton Gap he rushed, over Wharfe and Nidd, over Ure and Swale, only to be defeated by Cromwell at Marston Moor (1644). Liverpool was re-taken. Lathom was besieged again after the King's defeat at Naseby (1645), and the King was defeated at Rowton Heath near Chester in trying to relieve it. This time it held out for five months, to surrender on 4th December and be entirely demolished. Three years later Cromwell defeated the Scottish Royalist Army at Preston, driving part of it north and pursuing the remainder to Winwick and Warrington. Two years after the execution of the King in 1649, when Prince Charles invaded England, Lord Derby,

[1] Cf. *The Story of Old Halifax.* T. W. Hanson.

who had taken refuge in the Isle of Man, came again to Lancashire. He was defeated at Wigan, but joined the Prince at Worcester. After helping him to hide at Boscobel, he returned north and surrendered on quarter. But honour was not kept: he was beheaded at Bolton on 15th October, 1651.

Great as must have been the interruption to the growing cotton industry caused by the war at home, compensation was made by the removal of foreign competition through the war abroad. In 1618 had begun the Thirty Years' War. It broke out in Bohemia, where the intolerance of the King, who was also the Emperor Ferdinand II, produced a revolt. The next year, just as Ferdinand was crowned as Emperor, he was deposed as King in Bohemia, and a Protestant Prince, the Elector Palatine, husband of James I's beautiful daughter Elizabeth, and father of Prince Rupert, was elected in his place. Frederick was driven out of Bohemia and lost the Palatinate as well, but the war spread. It seemed likely at first that the Emperor, with his great Generals Tilly and Wallenstein, would swallow up all Germany, but other Powers stepped in. The first was Christian IV of Denmark, but he was easily disposed of. In 1630, however, came the Lion of the North, Gustavus Adolphus of Sweden, and many English and Scottish volunteers fought in his army, including that Earl of Craven who, as Macaulay depicts it, 'had led the forlorn hope at Creutznach with such courage that he had been patted on the shoulder by the great Gustavus, and who was believed to have won from a thousand rivals the heart of the unfortunate Queen of Bohemia'.[1] Gustavus was killed at Lutzen in 1632, but France under Cardinal Richelieu had already begun to intervene, and in 1635 openly entered the war. Ferdinand II died and was succeeded by Ferdinand III, Louis XIII died and was succeeded by Louis XIV, Cardinal Richelieu died and was succeeded by Cardinal Mazarin; but the war dragged on. At last peace was made in 1648.

The importance of the Thirty Years' War to the Lancashire cotton industry is that it left open to it a clear field. Before the end of

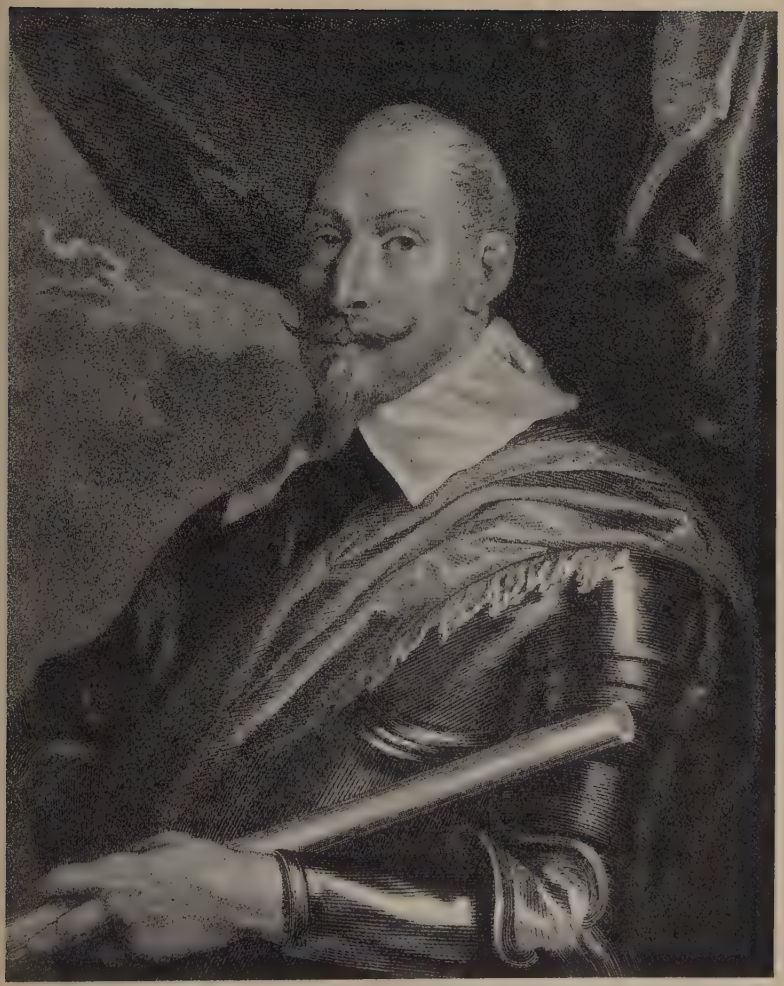
[1] Macaulay, *History of England*, vol. iii. p. 324.

the sixteenth century cotton was being manufactured at many centres in Germany—Ulm, Augsburg, Jena, Leipzig, Nuremberg. Indeed, Germany was far ahead of any European country in the manufacture of cotton. But the devastations of this appalling war wiped the manufacture almost out of existence. Almost, but not quite. In 1654, when the trade was restricted on account of the Dutch War, petitions were sent to the Council from Lancashire for liberty to buy cotton wool from France and Holland, lest the manufacture should revert to Hamburg, 'whence our cheaper making gained it'.[1] It did not revert. Fuller, writing in 1662, after mentioning the names of the Jena, Augsburg and Milan fustians, says: 'These retain their old names at this day, though these several sorts are made in this country, whose inhabitants, buying the cotton wool or yarne, coming from beyond the sea, make it here into fustians. . . . Bolton is the staple place for this commodity, being brought thither from all parts of the country'.

The London merchants were again busy in 1678 securing that all cloths and 'other commodities that go under the name of the new drapery, made or mixed with wool, worsted, jersey, or cruel, or with cotton wool' should be duly harboured in 'Blackwell Hall, Leaden Hall or the Welch Hall, or one of them.' A Pamphlet of the same year, *The Ancient Trades Decayed and Repaired Again*, points to a rival to the ancient woollen trade other than the new cotton industry at home:

> 'This trade (the woollen) is very much hindered by our own people, who do wear many foreign commodities instead of our own; as may be instanced in many particulars; viz. instead of green sey, that was wont to be used for children's frocks, is now *used painted and Indian-stained and striped calico*; and instead of a perpetuana or shalloon to lyne men's coats with, is used sometimes a *glazened calico*, which in the whole is not above 12d cheaper, and abundantly worse. And sometimes is used a *Bangale*, that is brought from India, both for lynings to coats, and for petticoats

[1] *Calendar of State Papers Domestic*, lxix. 7; quoted by Daniels in *The Early English Cotton Industry*.



GUSTAVUS ADOLPHUS
From a print by Paul Pontius after a picture by Van Dyck

too ; yet our English ware is better and cheaper than this, only it is thinner for the summer.'

LONDON,

Cargoe of the Benjamin *Arrived from* Surat *the* 21th *of* November, 1693.

	Pieces	Pounds	
Bafts broad white	1100		
ditto narrow brown	2640	91900	Cowries
Chints	6180	29000	Coffee
ditto Caddy	420	11200	Indico
Coffaes	500	51000	Olibanum
Deribands large	7735	311000	Pepper
ditto fmall	240	25500	Sticklack
Paurkaes	66200		
Romalls	3485		
Sheets Agra	52		
Sorts	47		
Sovaguzzees	2880		

An advertisement from Houghton's *A Collection for the Improvement of Trade and Agriculture*, 1693.

Defoe, writing in the *Weekly Review* in 1708, bore witness to the new fashion :

' The general fansie of the people runs upon East India goods to that degree, that the *chints* and *painted calicoes*, which before were only made use of for carpets, quilts, etc., and to clothe children and ordinary people, become now the dress of our ladies ; and such is the power of a mode as we saw our persons of quality dressed in Indian carpets, which but a few years before their chambermaids would have thought too ordinary for them : the chints was advanced from lying upon their floors to their backs, from the foot-cloth to the petticoat ; and even the queen herself at this time was pleased to appear in China and Japan, I mean China silks and calico. Nor was this all, but it crept into our houses, our closets, and bedchambers ; curtains, cushions, chairs, and at last beds themselves, were nothing but calicoes or Indian stuffs ; and in short, almost every thing that used to

be made of wool or silk, relating either to the dress of the women or the furniture of our houses, was supplied by the Indian trade.'

The Act of 1700, which forbade the introduction of Indian silks and printed calicoes, either for clothing or furnishing, under heavy penalties, does not seem to have been particularly effective. One way of evading it of course was to bring in the calicoes plain and dye them here, and this was done. The Act was intended to protect the firmly-established vested interests of the woollen industry. But it in fact caused the introduction of calico printing, and touches at other points the rising cotton industry. The Government could not go on winking indefinitely at the evasion of the law in bringing over Indian calicoes and dyeing them in England, and introduced a Bill (passed in 1721) to repair the flaw in the wording of the Act of 1700. Against this there were many petitions, one of which is of great importance, since it reveals the fact that in Dorset at all events cloths were manufactured in 1720 entirely of cotton. This is the report of it in the *Journal* of the House of Commons :

' A Petition of the Mayor, Aldermen, Bailiffs, Capital Burgesses and principal inhabitants of the Borough of Weymouth and Melcomb Regis in the County of Dorset, together with the Merchants, Masters of Ships, Master workmen, Weavers and Spinners of Cotton Wool imported from the British Plantations and manufactured in the town aforesaid, in behalf of themselves and many hundred of poor Cotton spinners in that neighbourhood was presented to the House and read, setting forth, that for many years past a manufacture had been carried on in the said town for making Cotton Wool imported from the British Plantations into cloth of divers kinds, more particularly into such fabrics as imitate calicoes ; which having, of late years, been printed and dyed, have afforded the manufacturers opportunity to support the Poor in that town and neighbourhood thereof. That the petitioners are apprehensive that the manufacture of cotton cloth in that town may, under the name of calicoes, be interdicted the weaving, by which means many hundred families of poor cotton spinners will be reduced to want, and the Manufacture of

that town entirely lost: and praying that the Cotton cloth manufactured in that town, both checqued, printed, and dyed, may be permitted to be worn in the same manner and liable to the same duties as the Manufacture of British and Irish Linens are permitted.' [1]

The other point of interest to note from the Act of 1721 is that, as printed calicoes were forbidden, the idea arose of using fustians instead. Printing of calicoes had already begun, and soon printed fustians began to make their appearance. As soon as these secured a certain vogue, the wool merchants of Norwich raised their voices in protest. Fustians were outside the scope of the Acts, and the printing of them was therefore legal, but to rid themselves of the insinuations of their rivals, the fustian manufacturers from Lancashire, Derbyshire, and Cheshire petitioned Walpole to define the position and put the legality of their action beyond a doubt. Possibly the Prime Minister thought he had done enough for Norwich by making its crepe the correct material for Court mourning. At all events he granted the fustian manufacturers their petition. Printed goods of linen yarn and cotton wool, manufactured at home, were declared to be excluded from the scope of the Act of 1721 as being a ' branch of the ancient fustian manufacture of this country'. This was the famous ' Manchester Act ' of 1736.

III

THE DOMESTIC SYSTEM

The Domestic System is the name given to the system under which industry was carried on, not in factories as it is now, but in the workers' own homes. It took the place of the old gild

[1] *J.H.C.* xix. 295. Quoted in Daniels' *The Early English Cotton Industry*.

system under which small masters, with the help of their journeymen and apprentices, made things and sold them themselves. The gilds finally disappeared early in the Tudor period; the Domestic System then arose, and continued till the factory system took its place. One reason why it lasted so long was that it was definitely supported by Tudor legislation, which aimed at stabilising society. Under Elizabeth's Statute of Apprentices,

SIR WILLIAM GILBERT

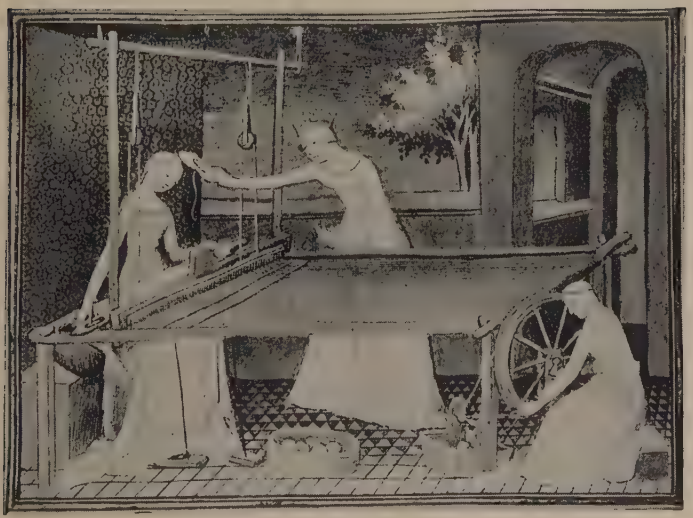
Justices of the Peace were authorised to assess wages, 'taking into account the plenty or scarcity of the time', and traditional skill was ensured by the provision that no one should practise any 'art, mistery or manual occupation' without first serving a seven years' apprenticeship. Moreover, though from the time of Bacon onwards England did not lack men who were bent upon 'enlarging the power and empire of mankind over the universe' (William Gilbert, 1540-1603, for example, gave the first scientific sketch of electricity and magnetism; Newton, in the years of the

Fire and the Plague, invented the infinitesimal calculus and discovered the law of gravitation), the government definitely discouraged all inventions in industry with the exception of one or two, like the printing press and the lathe, which seemed to them to be useful and unlikely to disturb existing industrial conditions. Thus gig mills (1552), stocking machines (1589) and needle machines (1623) were all prohibited in the interests of preserving traditional skill. The Domestic System lasted nearly three centuries (*c.* 1500-1780). But during this long period it of course changed considerably. In particular there was a steady tendency towards greater organisation by the employer, the capitalist, and the middleman. More and more the spinner and the weaver tended to lose their independence. But from the workers' point of view there remained great advantages. The greatest of these was the comparative freedom, and the absence of supervision and regulation. There were no fixed hours, no factory bell. If the work was as arduous, involving, as later under the factory system, the labour of the whole family down to the smallest child, there was less breaking up of family life, and there was more variety in the work itself. Often the textile worker owned a little land, and could relieve his ears from the clicking of his loom by going out to feed his pigs or to dig his potatoes.[1] Those who did not own land could readily obtain work on the land in busy seasons. In short under the domestic system the worker was an individual. Though he had no vote, like his successor of to-day, he enjoyed a fuller life and had a greater stake in the country.

One must be careful not to exaggerate. The conditions were primitive. The spinning wheel was not capable of much more

[1] 'The workshop of the weaver was a rural cottage, from which when he was tired of sedentary labour he could sally forth into his little garden, and with the spade or the hoe tend its culinary productions. The cotton wool which was to form his weft was picked clean by the fingers of his younger children, and was carded and spun by the older girls assisted by his wife, and the yarn was woven by himself assisted by his sons'. Ure, *Cotton Manufacture of Great Britain*, i. p. 191.

AN UPRIGHT LOOM
11th century



LOOM AND SPINNING WHEEL
15th Century

rapid work than the distaff of Homeric days; and some still preferred the distaff. John Dyer, writing in 1757, observed that

> 'many yet adhere
> To th' ancient distaff, at the bosom fixed,
> Casting the whirling spindle as they walk'.

Weaving was done on a machine of design hardly less ancient. Dyer describes its history thus:

> 'The loom, that long-renown'd, wide-envy'd gift
> Of wealthy Flandria, who the boon receiv'd
> From fair Venetia; she from Grecian nymphs;
> They from Phenice, who obtain'd the dole
> From old Aegyptus'.[1]

Children were everywhere employed, and had to work very hard. We have already seen that when Queen Elizabeth visited Norwich in 1579, part of the pageant prepared for her was an exhibition of children spinning worsted yarn and knitting worsted hose, 'a shewe which pleased Her Majesty so greatly as she particularly viewed the knitting and spinning of the children'. Defoe in his travels saw children at work over and over again, at Colchester, in the making of bays, in the West of England clothing area and in the West Riding. John Gay, in his *Rural Sports*, published in 1713, and dedicated to Pope, refers to it in his picture of the rural matron:

> 'With secret joy she sees her little race
> Hang at her breast and her small cottage grace;
> The fleecy ball their busy fingers cull,
> Or from the spindle draw the lengthening wool:
> Thus flow the hours with constant peace of mind
> Till age the latest thread of life unwind'.

In spite of the 'peace of mind' assumed by Gay, there was discontent in plenty, and there were combinations and strikes under the Domestic System, like the woolworkers' strike at Norwich in 1754, and the combination of the weavers of Manchester in 1756. Exorbitant rates were charged by the

[1] *The Fleece*, Book III.

'capitalist' employers for the use of looms and frames. Payment was made in 'truck' instead of in cash. Southey's description of the system as 'contentment spinning at the cottage door' has been attacked by Macaulay,[1] and called sentimental and overdrawn. Perhaps it was, as a picture of the system in its later stages. But few would venture to call Shakespeare sentimental, who immortalised the independence and freedom of the domestic spinners, knitters, and lacemakers of his day, singing over their work :

> 'The spinsters and the knitters in the sun,
> And the free maids that weave their thread with bones'.[2]

The loss in freedom involved in the change to factory life was taking place in Wordsworth's day under his very eyes ; he felt it deeply and described it faithfully :

> 'The habitations empty ! or perchance
> The mother left alone,—no helping hand
> To rock the cradle of her peevish babe ;
> No daughter round her, busy at the wheel
> Or in dispatch of each day's little growth
> Of household occupation ; no nice arts
> Of needlework ; no bustle at the fire,
> Where once the dinner was prepared with pride ;
> Nothing to speed the day, or cheer the mind,
> Nothing to praise, to teach, or to command' ![3]

The best picture we have of England in the closing years of the Domestic System can be read in the pages of Defoe's *Tour through the whole Island of Great Britain*. To make this survey Defoe took seventeen journeys during the years 1724-27. He was a keen observer, and had more interest in trade and industry than most writers ; for, after nearly losing his life in Monmouth's rebellion, he took up wool-trading for a time, and held 'the manufactures of England to be as well worth a Traveller's notice as what you fine gentlemen call "curiosities".' London was

[1] Macaulay's *Essay on Southey*.
[2] *Twelfth Night*, ii.
[3] *Excursion*, Book VIII.

growing apace, 'stretched out in buildings at the pleasure of every undertaker of building': Westminster was in a fair way to shake hands with Chelsea, and St. Giles with Marylebone. It was the centre of the country, drawing the productions of all parts to itself. Cattle were driven up and grazed near by on Essex pastures to grow fat for Smithfield market. The very geese walked up from Norfolk and Suffolk, taking three months to do it (August to October), till a sort of four-decked waggon was devised to carry them. The largest sheep and the great black coach and dray horses—'of which so great a number are continually brought up to London'—came from Leicestershire, whose county town, as well as Derby and Nottingham, had a considerable manufacture 'for weaving of stockens by frames'. In Norfolk, Defoe beheld 'a face of diligence spread over the country'. So busy was everyone in Norwich at his loom, that if you entered it you would think it a city without inhabitants.

In the West Riding there was similar business and industry. As he approached Halifax Defoe found the country more and more thickly populated, scarce a house out of speaking distance from the next, and each full of lusty fellows, some at the dye-vat, some at the loom, at every house a tenter and on every tenter a piece of cloth, kersey, or shaloon. The Leeds cloth market was 'perhaps not to be equalled in the world'. The Western clothing field also was working full time. In Taunton everyone from five years old was employed, as they were at Colchester. The market at Exeter was second to Leeds only for the fact that it was held once a week, whereas at Leeds it was every Tuesday and Saturday. Frome was putting up whole streets of houses, and had grown almost as much as Manchester, which Defoe styles 'the greatest mere village in England', adding wrathfully that 'it is neither a walled town, city, nor corporation; it sends no members to Parliament, and the highest Magistrate there is the Constable. . . .' 'You have here', he says, 'an open village, which is greater and more populous than many, nay, than most cities in England. Neither York, Lincoln, Chester, Salisbury,

MANCHESTER IN 1740

Winchester, Worcester, Gloucester, no nor Norwich itself, can come up to it, and for lesser cities, two or three put together, would not equal it, such as Peterborough, Ely and Carlisle, or such as Bath, Wells and Lichfield'. His visit to Stourbridge Fair had prepared Defoe for the greatness of Manchester, for there he had noted 'near 1000 horsepacks' of cottons, Manchester wares, fustians and things made of cotton wool. At Bury, famous for its half-thicks and kersies, his southern blood despaired, on seeing the mountains covered with snow in the middle of August, but was consoled with the good ale, 'the people of those parts having a happy way of mixing the warm and the cold together'. At Bolton Defoe saw nothing remarkable (an omission for which Boltonians have never forgiven him), 'save that the cotton manufacture reached hither, though the place did not, like Manchester, seem so flourishing and increasing'. Liverpool Defoe calls 'one of the wonders of Britain'. He had visited it in 1680 and again in 1690, when he found it much grown. But at his third visit, 'it was more than double what it was at the second'. Liverpool was the counterpart and rival of Bristol. Both traded with Virginia and the American Colonies, and with Ireland, and both supplied extensive areas of England with imports. But the rivalry was a friendly one: the freemen of Liverpool were, 'in consequence of that freedom, free also of Bristol'. There was a fine 'Town-house' on pillars of freestone, and beneath it the Tolsey or Exchange, for the meeting of the merchants, which was, Defoe noted, insufficient: 'they begin to want room and talk of enlarging it, or removing the Exchange to some other part of the town, where the ships and merchants' business is nearer at hand'. Thirty years later (1755) John Wesley visited Liverpool and found it 'one of the neatest, best-built towns I have seen in England. I think it is full twice as large as Chester. Most of its streets are quite straight'. Already in Defoe's time the lay-out of its streets distinguished it. 'There is no town in England, except London, that can equal Liverpool for the fineness of the streets and beauty of the buildings; many of the houses are all of freestone and

LIVERPOOL IN 1650

completely finished; and the rest (of the new part I mean) of brick, as handsomely built as London itself'. But what most aroused Defoe's admiration was the new dock—'a large basin, a wet dock, at the East end of the town, where . . . they have brought the tide from the Mersey to flow up by an opening that looks to the south, and the ships go in north; so that the town shelters it from the westerly and northerly winds, the hills from the easterly, and the ships lie as in a mill-pond, with the utmost safety and convenience'. At Preston there was in 1725 'no manufacture'; the town was full of attorneys, proctors and notaries; 'the people are gay here, though not perhaps the richer for that; but it has, on this account, obtained the name of Proud Preston'. Lanark, another town afterwards famous in the story of cotton, and the capital of Clydesdale, was then 'remarkable only for being the place where the rebels at Bothwell-bridge assembled'.

Liverpool had no fortifications, either to landward or seaward, 'though', Defoe observed, 'when the late Northern insurrection (the 'Fifteen) spread down their way and came to Preston, they would have been glad of walls and gates'. But at Preston the 'Fifteen was turned back: it never reached the cotton district. It was otherwise with the 'Forty-five, after which year George II was in the habit of asking of each visitor from the County Palatine who came to court, 'Well, well, well; are you all quiet in Lancashire now?' Victorious at Preston-Pans, Prince Charles Edward and his army marched into England and took Carlisle. Great excitement prevailed. 'The rebellion, you may guess', wrote the poet Shenstone on 22nd November, 'is the subject of all conversation. Every individual nailer here takes in a newspaper and talks as familiarly of kings and princes as ever Master Shallow did of John of Gaunt'. At this moment the army was halting at Penrith. On the 27th it was at Preston. Next day Manchester was taken by 'a sergeant, a drum and a woman'. One of the Chevalier de Johnstone's sergeants, Dickson, had asked permission to go forward to Manchester to make sure of some recruits before the arrival of the army. 'He

quitted Preston', writes de Johnstone, 'with his mistress and my drummer and, having marched all night, reached Manchester and immediately began to beat up recruits for "the yellow-haired laddie"'. Indifferent at first, the tick and fustian workers soon closed in upon him, but he presented his blunderbuss so threateningly, pointing it now here now there, that he enlarged the circle till the friends of the House of Stuart rushed in and stood beside him. Next day he was able to present 180 recruits, having incurred expenses of only three guineas. Thus was raised Colonel Towneley's famous Manchester regiment, which shared in the march southwards, *via* Macclesfield and Stockport, to Derby. Manchester, however, as a whole, was not enthusiastic. It had no desire to risk the destruction of its looms or the suspension of its credit. Nor was its zeal increased by learning that Liverpool had raised a regiment of 700 foot to oppose the insurrection, paying for them by public subscription. John Byrom, the poet and inventor of shorthand, was a prominent Manchester man in those days. His daughter records in her diary, 'My papa and my uncle are gone to consult with Mr. Croxton, Mr. Fielden and others how to keep themselves out of any scrape and yet behave civilly'. Miss Byrom, like all the ladies, was bewitched by the gallant spectacle of the Prince on horseback. Dressed up in her white gown, she was taken by 'Secretary Murray' to kiss his hand. 'My papa was fetched prisoner to do the same, as was Dr. Deacon; Mr. Cattell and Mrs. Clayton did it without'. Byrom—though a Jacobite in sentiment—showed in his reluctant allegiance a discretion worthy of a city whose trade was its main concern. His toast of the King is famous:

> 'God bless the King! I mean our Faith's defender!
> God bless—no harm in blessing—the Pretender!
> But who Pretender is, or who is King,
> God bless us all, that's quite another thing'!

Manchester received the Highlanders on their retreat northwards 'with visible marks of dislike', so that Charles Edward imposed

a fine of £5000 upon the city. The bulk of the Manchester regiment was left, with about twice as many Highlanders, to hold Carlisle. The Duke of Cumberland came up on 21st December. The bombardment began on the 28th, and on the 30th a white flag was hung out from the battlements. John Hamilton, the governor, asking what terms would be given, was told 'All the terms his Royal Highness will, or can, grant to the rebel garrison of Carlisle are that they shall not be put to the sword, but be reserved for the King's pleasure'. The Duke was then summoned south to take command of the forces assembled to guard the south coast against a threatened French invasion, leaving General Hawley to lead the army into Scotland. Hawley was defeated at Falkirk, and Cumberland was sent back post haste, travelling night and day. The nation's feelings on the matter were much like those of the poet Gray, who wrote (3rd February, 1746) to Horace Walpole, 'Our defeat, to be sure, is a rueful affair for the honour of our troops; but the Duke is gone, it seems, with the rapidity of a cannon-bullet to undefeat us again'. The Duke did 'undefeat' us. At Culloden a dynastic contest of fifty-seven years was ended in fifty-seven minutes. But the aftermath was tragic. The first persons brought to trial were Colonel Towneley and seventeen of his officers of the Manchester regiment who had been left to their fate at Carlisle; and while the dregs of the London populace gazed on their heads, and those of other Manchester rebels, displayed on Temple-bar, through spy-glasses, 'at a half-penny a look',[1] the bitter feeling of the nation consigned 'Butcher' Cumberland to well-merited oblivion, planting Scotch firs in Windsor Great Park, and contemplating his favourite Virginia Water.

Manchester had opened its first Exchange—built by Sir Oswald Mosley, lord of the Manor, in 1729. Its trade was rapidly expanding. Defoe had seen it making 'a kind of cloth called fustians, partly out of cotton wool from Smyrna and the Levant and partly out of linen and even wool'. John Dyer, the poet of

[1] Letter of Horace Walpole to Mann, Aug. 16, 1746.

the sister industry, in *The Fleece* tells how the partnership between wool and cotton was progressing. Wool was

> ' now taught to link
> With flax, or cotton, or the silk-worm's thread
> And gain the graces of variety,
> Whether to form the matron's decent robe
> Or the thin-shading trail for Agra's nymphs,
> Or solemn curtains, whose long gloomy folds
> Surround the soft pavilions of the rich '.

On ' Agra's nymphs ' Dyer adds this interesting note : ' There is woven at Manchester, for the East Indies, a very thin stuff, of thread (*i.e.* woollen thread) and cotton, which is cooler than the manufactures of that country, where the materials is only cotton '. Manchester was also making other tropical clothing out of cotton :

> ' On Guinea's sultry sand the drapery light
> Of Manchester or Norwich is bestow'd
> For clear transparent gums, and ductile wax,
> And snow-white ivory. . . .
> Again, and oft, th' adventurous sails disperse,
> These to Iberia, others to the coast
> Of Lusitania, th' ancient Tharsis deem'd
> Of Solomon ; fair regions, with the webs
> Of Norwich pleas'd or those of Manchester ;
> Light airy clothing for their vacant swains
> And visionary monks '.

Some of the raw cotton was coming from India :

> ' Still Bombaya's wharfs
> Pile up blue indigo, and, of frequent use,
> Pungent salt-petre, woods of purple grain,
> And many-coloured saps from leaf and flower,
> And various gums ; the clothier knows their worth ;
> And wool-resembling cotton, shorn from trees,
> Not to the fleece unfriendly ; whether mixt
> In warp or woof, or with the line of flax,
> Or softer silk's material : though its aid
> To vulgar eyes appears not '.

Cotton was steadily winning its way and planting itself upon the older woollen industry, a development shown symbolically in the arms of the County Borough of Rochdale (in Defoe's time a woollen town), where a wool pack is encircled by two branches of the cotton-tree, with a fleece as part of the crest. Stalybridge affords a typical instance of what was going on. In 1700 its industry was the weaving and dyeing of woollen cloth. Fifty years later its principal job was to spin worsted yarn for the Nottingham hosiers, and the dyeing was done by one dyer, who ground his dyes in a little gin worked by two big mastiffs. But cotton had made its entry. In 1763 both cotton-spinning and weaving were becoming common in the cottage garrets and shops, and a mill was soon erected in which carding was done by water-power. This mill was later known as the Soot-poke Mill, a name bestowed upon it in honour of its tall chimney, when a steam-engine took the place of its water wheel. Thus the manufacture of cotton was at first carried out under the domestic system in the homes ; many who hailed Queen Victoria's accession could remember seeing it washed with soap and hot water in the houses of the workers and dried by the kitchen fire. They could recall it being stretched out on small cards and rolled on a table, and spun on a single spindle. They could remember the early carding engines, which one turned by a handle as if one were turning a grindstone.

One of the greatest drawbacks to the domestic system, from the point of view of the employer at all events, was the amount of fetching and carrying of material which it involved and the consequent slowness of production. Raw cotton had to be got to the home of spinners, scattered perhaps over the country-side.[1] When spun it had to be collected and re-distributed to the weavers. The woven cloth had then either to be marketed as it was, ' in the grey ', or sent to the dyer ; or, if it was to be printed, Indian-fashion, with a pattern, sent to London ; for the early

[1] ' Our spinners are poor people, women commonly scattered about on all different parts of the country, without support or protection '. Adam Smith, *Wealth of Nations*, 1776.

calico-printing, by means of blocks, was done in London.[1] This would have been serious even had there been good roads and canals. But there were as yet no canals, and roads were bad and bridges few. Travellers from north to south had to pass a clay

THE ARMS OF ROCHDALE

belt right across England, which Defoe tells us was 'perfectly frightful to travellers'. Even in 1771 Arthur Young, on the road to Wigan, found 'rutts which I actually measured four feet deep and floating with mud only from a wet summer. . . . I actually passed three carts broken down in these eighteen miles'. The

[1] Cf. Baines, *History of the Cotton Industry*, pp. 261-262. The first firm to print calico in Lancashire was that of Messrs. Clayton, of Bamber Bridge, near Preston. This was in 1764. Robert Peel, grandfather of the repealer of the Corn Laws, shortly afterwards took up calico printing and developed it with great vigour.

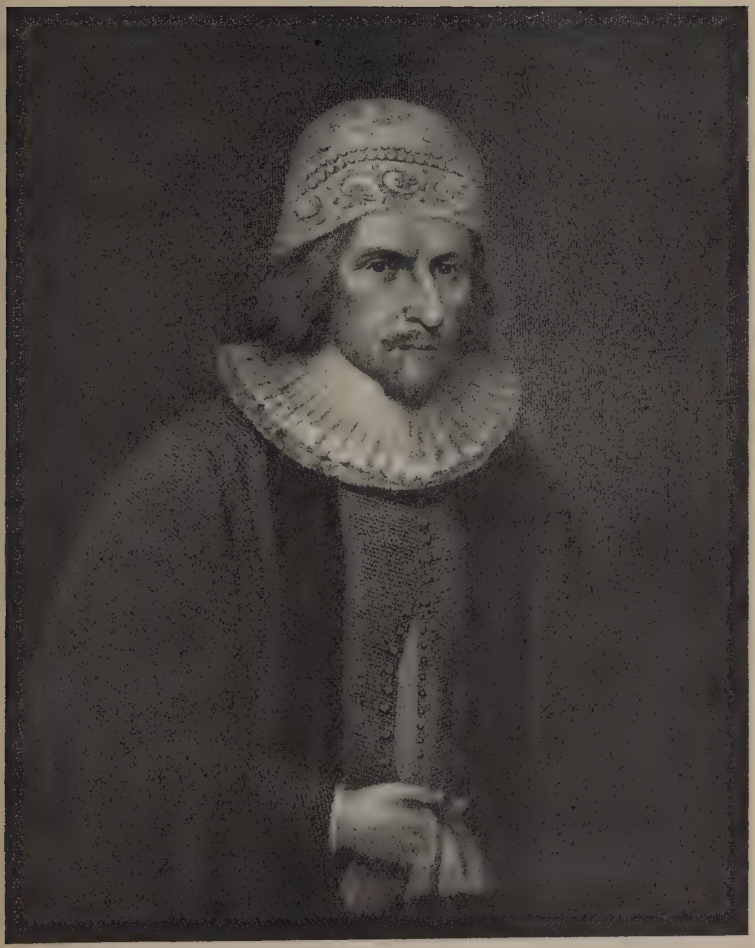
great north road was 'execrably broke into holes like an old pavement, sufficient to dislocate one's bones'. John Dyer points the moral in ascribing the wealth, peace and prosperity of China to its roads.

> 'Various is the wealth
> Of that renown'd and ancient land, secure
> In constant peace and commerce, till'd to the height
> Of rich fertility; where, thick as stars,
> Bright habitations glitter on each hill. . . .
> No wonder; when
> In every province firm and level roads
> And long canals, and navigable streams,
> Ever, with ease, conduct the works of toil
> To sure and speedy markets'.[1]

As things were in eighteenth-century England, it is clear that any system of industry which lessened the amount of the carrying to and fro of goods in process of manufacture would be as welcome to the employer as to the pack-horse.

It is unlikely that, at any period in the story of the English manufacture of cotton, there was any considerable number of independent workers. Defoe makes it clear that in the older woollen industry, though there were such independent workers round Halifax, the 'Gentleman Clothier' controlled matters in the eastern and south-western fields. Combers were a peculiar people, and bought wool and sold it on their own account, but carding was chiefly done by workmen hired by the clothier. An early counterpart, in the cotton industry, of the typical clothier in the woollen, was Humphrey Chetham (1580-1653). The Manchester trade in his day comprised fustians (for which Bolton was the chief centre) and checks and smallware 'commodities', as Fuller humorously puts it, 'so small in themselves and various in their kinds that they will fill the shop of an haberdasher of small wares. Being, therefore, too many for me to reckon up and remember, it will be the safest way to wrap them all together in some *Manchester Tickin*, and to fasten them with

[1] *The Fleece*, Book IV.



HUMPHREY CHETHAM
From an engraving of 1831

the *Pinns* (to prevent their falling out and scattering), or tie them with the *Tape*, and also (because sure bind, sure find) to bind them about with *Points* and *Laces*, all made in the same place'.[1] Humphrey Chetham was engaged in this Manchester trade. He had a partnership with his brother George, George managing the London branch and being a member of the Merchant Taylors' Company. We know from his accounts[2] that he dealt in cotton (called in the accounts 'Cypress wool') and in linen yarn, the two principal ingredients from which fustians were made. The accounts also show that wool was sold in small quantities to various persons, and that much of it was sold on credit. Chetham is known, moreover, to have employed spinners, weavers, and finishers over a considerable area. The inference clearly is that he was an employer on a fairly extensive scale. He became rich; bought Clayton Hall near Manchester, where he chiefly lived after 1620; bought Turton Tower near Bolton in the year of the Petition of Right, and so attracted the attention of his impecunious monarch as a person capable of paying the fees for knighthood. In spite of his remonstrances he was made High Sheriff of Lancashire in 1634, thereby incurring as one of his first duties the unpleasant task of levying Ship Money. After the King's execution in 1649 he spent his last four years of life more happily founding his 'College' for the education of poor boys of his native county, and arranging his bequests for his hospital and library.

From Chetham's day onwards the domestic worker tended to become less and less independent. One catches glimpses—*e.g.* in the evidence of the Petition that led to the passing of the 'Manchester Act' of 1736—of employers employing two or three thousand persons.[3] As time went on the pressure on the spinners particularly became more and more severe, and every device was adopted to make them increase their output. The yeoman probably kept agriculture as his main means of livelihood to the

[1] Fuller's *Worthies*, ii. 538; quoted in Espinasse's *Lancashire Worthies*.

[2] Cf. Daniels, *The Early English Cotton Industry*, p. 35.

[3] Cf. Daniels, *The Early English Cotton Industry*, p. 23.

TURTON TOWER
From an engraving of 1836

end, that is, till the advent of new methods of farming on the one hand, and of machinery in factories on the other, took away both his means of livelihood at once. The artisans, who rented some land and farmed it, slowly decreased in number, and became more and more dependent on the employer and the middleman. There was every temptation to the energetic and ambitious man to try to coerce workers to work to his ideas. Eustace Budgell, writing half-humorously in the *Spectator* of 24th January, 1711-12, observed, 'Trade and commerce might doubtless be still varied a thousand ways, out of which would arise such branches as have not yet been touched. The famous Doily is still fresh in everyone's memory, who raised a fortune by finding out materials for such stuffs as might at once be cheap and genteel. I have heard it affirmed, that had he not discovered this frugal method of gratifying our pride, we should hardly have been able to carry on the last war'.[1] In spite of the bantering tone of this sally, Doily had made a name. Dryden spoke of 'Doily petticoats', Gay mentions a 'Doily habit', and Steele had a 'Doily suit'. It is not difficult to imagine the incentives that presented themselves to ambitious men. A vivid picture, 'which for spirit, boldness, and truth may vie with an *interior* of Tenniers', of the cottage of the domestic manufacturer before machinery was invented, followed by 'a familiar, striking and just history, illustrated by a single specimen, of the growth of the great manufacturing villages and towns', is given by William Radcliffe, the inventor of the dressing machine, and is quoted by Baines.[2] Radcliffe, who at one time employed over 1000 domestic spinners living in three different counties, tells how his father, failing to make farming pay, had recourse to the usual method of subsistence at that period, the loom for men and the cards and handwheel for women. Radcliffe's mother was a spinster, and had taught him early how to card and spin cotton and wind linen and cotton weft. When he was strong enough his father put

[1] *Spectator*, No. 283.

[2] *Origin of Power-Loom Weaving*, by William Radcliffe, pp. 59-66; most of it quoted in Baines, *History of the Cotton Manufacture*, pp. 339-341.

him to the loom, and soon he acquired practical experience of every process from the cotton-bag to the piece of cloth—carding by hand or by engine, spinning by handwheel or jenny, winding, warping, sizing, looming the web, and weaving either by hand or by fly-shuttle. By 1789 he had got on so well that he had become a master manufacturer on his own account. He thus describes in his own parish of Mellor, fourteen miles from Manchester,[1] first the domestic system as he saw it, and then the changes that ensued as machinery was introduced, and took its place :

'In the year 1770 the land in our township was occupied by between fifty to sixty farmers ; rents, to the best of my recollection, did not exceed 10s. per statute acre, and out of these fifty or sixty farmers there were only six or seven who raised their rents directly from the produce of their farms ; all the rest got their rent partly in some branch of trade, such as spinning and weaving woollen, linen, or cotton. The cottagers were employed entirely in this manner, except for a few weeks in the harvest. Being one of those cottagers, and intimately acquainted with all the rest, as well as every farmer, I am the better able to relate particularly how the change from the old system of hand-labour to the new one of machinery operated in raising the price of land in the subdivision I am speaking of.

'Cottage rents at that time, with convenient loom-shop and a small garden attached, were from one and a half to two guineas per annum. The father of a family would earn from eight shillings to half a guinea at his loom, and his sons, if he had one, two, or three alongside of him, six or eight shillings each per week ; but the great sheet-anchor of all cottages and small farms was the labour attached to the hand-wheel, and when it is considered that it required six to eight hands to prepare and spin yarn, of any of the three materials I have mentioned, sufficient for the consumption of one weaver—this shows clearly the inexhaustible source there was for labour for every person from the age of seven to eighty years (who retained their sight and could move their hands) to earn their bread, say one to three shillings per week, without going to the parish.

[1] In Derbyshire ; not the Mellor near Blackburn.

'From the year 1770 to 1788 a complete change had gradually been effected in the spinning of yarns. That of wool had disappeared altogether, and that of linen was also nearly gone: cotton, cotton, cotton, was become the almost universal material for employment. The hand-wheels, with the exception of one establishment, were all thrown into lumber-rooms, the yarn was all spun on common jennies, the carding for all numbers, up to 40 hanks in the pound, was done on carding engines; but the finer numbers of 60 to 80 were still carded by hand, it being a general opinion at that time that machine-carding would never answer for fine carding numbers. In weaving no great alterations had taken place during these eighteen years, save the introduction of the fly-shuttle, a change in the woollen looms to fustians and calico, and the linen nearly gone, except the new fabrics in which there was a mixture of cotton. To the best of my recollection there was no increase of looms during this period—but rather a decrease. . . .

'The families I have been speaking of, whether as cottagers or small farmers, had supported themselves by the different occupations I have mentioned in spinning and manufacturing, as their progenitors from the earliest institutions of society had done before them. But the mule-twist now coming into vogue, for the warp, as well as weft, added to the water-twist and common jenny yarns, with an increasing demand for every fabric the loom could produce, put all hands in request of every age and description.

'The fabrics made from wool or linen vanished, while, the old loom-shops being insufficient, every lumber-room, even old barns, cart-houses, and out-buildings of every description were repaired, windows broke through the old blank walls, and all fitted up for the loom-shops. This source of making room being at length exhausted, new weavers' cottages with loom-shops rose up in every direction: all immediately filled, and when in full work the weekly circulation of money, as the price of labour only, rose to five times the amount ever before experienced in this subdivision, every family bringing home weekly 40, 60, 80, 100, or even 120 shillings per week.'

With the disappearance of domestic spinning, which almost ceased as a cottage industry in 1785 though in outlying parts it lingered till 1840, the last vestige of the Domestic System may be

said to have vanished. It is interesting to compare with Radcliffe's account of these last rites the account given in 'A Description of Manchester' in 1783, by 'A Native of the Town'. Spinning machines, he tells us,

> 'were first used by the country people on a confined scale, twelve spindles being thought a great affair at first, and the awkward posture required to spin on them, was discouraging to grown up people, while they saw with a degree of surprise, children, from nine to twelve years of age, manage them with dexterity, which brought plenty into families, that were before overburthened with children, and delivered many a poor endeavouring weaver out of bondage to which they were exposed, by the insolence of spinners, and abatement of their work, for which evils there was no remedy till spinning-jennies were invented. The following state of their case, will give our readers an idea of the oppression.
>
> 'From the time that the original system was changed in the fustian branch, of buying pieces in the grey from the weavers, by delivering them out work, the custom of giving them out weft in the cops, which obtained for a while, grew into disuse, as there was no detecting the knavery of spinners till a piece came in woven; so that the practice was changed, and wool given with warps, the weaver answering for spinning; and the weavers, in a scarcity of spinning, have been paid less for the weft than they gave for the spinner, but durst not complain, much less abate the spinner, lest their looms should stand unemployed: but when jennies were introduced, and children could work on them, the case was altered, and many who had been insolent before, were glad to be employed in carding and slubbing cotton for these engines.
>
> 'The plenty of weft produced by this means gave uneasiness to the country people, and the weavers were afraid lest the manufacturers should demand finer weft woven at the former prices, which occasioned some risings, and the jennies were opposed, some being demolished before those who used them could be protected, or convince others of their general utility, till Dorning Rasbotham, Esq., a worthy magistrate who lived in that part of the country, towards Bolton, where they were used, convinced the weavers, in a sensible printed address, that it was their true interest to encourage jennies, urging the former insolence of

spinners, and the happiness of such as had already relieved themselves, and procured employment for their children ; and appealed to their own experience of the fly shuttle, against which the like clamour had been raised, and the inventor driven to France, where he found encouragement, while his shuttles are yet in such estimation here, as to be used generally even on narrow goods, to the benefit of trade in general, without any bad consequence in the experience of several years, but they are rather of particular benefit to the weavers.

'This seasonable address produced a general acquiescence in the use of these engines, to a certain number of spindles, but they were soon multiplied to three or four times the quantity'.

IV

THE GREAT INVENTIONS

Lancashire, two hundred years ago, was a very different region from the one we know to-day. It was then regarded as one of the less important parts of England ; the towns were small, and most of the county was thinly peopled. The roads were very few and bad, and altogether the region which is now so well known all over the world gave but little promise of its future importance. In 1725 the era of great inventions had not begun ; and although Manchester, Rochdale, and Bolton were already known for their looms and textile fabrics, these were almost wholly produced under the Domestic System. We often meet with references to 'Manchester cottons' in the history of the later Middle Ages and early Modern Times, but the fabrics mentioned were mostly made of linen and wool, and were not at all like the cotton goods for which the Manchester province has since become so famous.

Lewes Roberts' interesting picture of the trade of Manchester in the year 1641 has been quoted.[1] The accuracy of his obser-

[1] See Chapter II. p. 40.

vations is borne out a hundred years later by Malachy Postlethwayt, who published the *Dictionary of Trade and Commerce*, which he had been twenty years compiling, in 1751. He scarcely mentions cotton, and then only as a subsidiary to linen, and to point out that a great quantity of raw cotton is used in connection with the linen industry. Postlethwayt says of linen —' it is a commodity of universal use . . . and (it) cannot be supplanted by anything else near so commodious and agreeable for those uses to which it is applied. The use of the Indian cotton-cloth has often been attempted for shirting but to no purpose '.

The domestic industry workers, at least in Western Europe, could not yet spin cotton to serve for warp as well as for weft, and the cloths which were made had always a basis of wool or linen. This, as we see clearly from Postlethwayt, held until the Domestic System of making fabrics began to give way in the middle of the eighteenth century. It should be borne in mind that it was illegal to weave cloth entirely of cotton in the early part of that century. In 1736 it became permissible to use cotton for weft, provided the warp was of wool. An Act of Parliament of 1774 legalised the manufacture of fabrics entirely of cotton. It is significant that Arkwright had made calicoes on a considerable scale in 1773, with cotton both as warp and weft.

The operations in the making of the cloth at that time were essentially the same as to-day ; the raw fibre passed through the processes of cleaning, carding, drawing and roving, spinning and, finally, weaving and finishing. The cleaning and carding at the beginning, and the weaving and finishing at the end, were generally done by the men ; the women mostly did the spinning. As a rule these operations were carried on in the workers' homes, and the spinning wheel and the hand loom were practically the same as they had been all through the Middle Ages. The simple spinning wheel, belonging to the women folk, stood in the common living and work room ; the hand looms often stood in the small rooms upstairs.

The wool or raw cotton which was to be made into yarn was first roughly cleaned and then carded. This process has

originally been done by using the hard bristles of the thistle (*Latin*, carduus—a thistle, hence the name of the process). In the days immediately before the great mechanical inventions there were specially made hand 'cards' in use; these were brushes made of short pieces of wire, stuck at the proper angle into a sheet of leather which was fastened to a flat piece of wood, measuring about twelve inches by five inches. This instrument was provided with a handle, and the cotton or wool was laid on the card and worked over and over again with a similar card until all the fibres were laid out straight. It was then stripped off the card as a fleecy roll ready for the first part of the spinning process. The spinner turned the spinning wheel with one hand, and thus made the spindle revolve; with the other she drew out the cardings which were made into thick threads called rovings, and wound on the spindle in the form of a 'cop'. In a second, similar process these 'rovings' were spun into yarns; here, of course, the thread was drawn out much finer, and at the same time received more twist.

In weaving by hand-loom the shuttle, which carried the weft, was passed from hand to hand, and this restricted the width of the cloth produced, which seldom exceeded thirty inches. If wider cloth was required two weavers were needed, one of whom passed the shuttle to the other:

> 'from hand to hand
> The thready shuttle glides along the lines
> Which open to the woof and shut altern;
> And ever and anon, to firm the work,
> Against the web is driven the noisy frame,
> That o'er the level rushes like a surge. . . .
>
> Or if the broader mantle be the task,
> He chooses some companion to his toil.
> From side to side, with amicable aim,
> Each to the other darts the nimble bolt,
> While friendly converse, prompted by the work,
> Kindles improvement in the opening mind'.[1]

[1] Dyer, *The Fleece*, Book III.

WOMEN SPINNING, CARDING AND WEAVING
15th Century

In spite of the cumbrous working of the hand-loom the weavers could more than keep pace with the spinning wheels of the women, and it is said that six or eight spinners had to work to provide sufficient yarn for one weaver. This was the state of things in, say, 1725, the year mentioned above. But already there was a stir in the air, and the beginnings of the great changes in methods were not long in coming.

One may divide the 200 years between 1725 and the present time into two sections, the first of about 120 years and the second of eighty years. In the years between 1725 and 1845 we can distinguish two great parallel movements: on the one hand the great inventions in the textile industries themselves, and on the other the wonderful developments in the means of communication. These two great movements acted and reacted on each other, and also received impetus and direction from other great advances of the times, such as the new method of smelting iron and the improvements in the steam engine. All these made that great change in British life now generally spoken of as the Industrial Revolution, which transformed South Lancashire from a thinly peopled and remote region into a densely peopled and important province in the modern world.

The great inventions began in the years from 1733 to 1738, when John Kay of Walmersley, near Bury, inheriting an interest in machinery from his father, who brought Dutch drawboy and inkle looms from abroad, invented and made good his mechanical shuttle, generally known in the picturesque language of the time as the 'flying shuttle.' Two strings were attached to the opposite ends of the lathe of the loom, and both were held by a peg in the weaver's hand. By a sudden pluck he could send the shuttle with its weft across the loom—that is, through the threads of the warp. It was thus possible to weave about twice as fast as before, and also to weave a much wider cloth. This caused the spinners to fall still more into arrear; we read of weavers walking many miles to get sufficient yarn, and a premium was frequently paid for quick spinning. Kay was typical of the artisan inventor of the eighteenth century; he improved the warp reeds

of his day by using metal instead of cane ; he patented a twisting and carding machine ; and he invented a windmill for pumps. His home was wrecked by a mob of workers in 1753, and all his machines and other effects were destroyed. He went to France, very likely in disgust, and died there, it is said, as a pauper, his

JOHN KAY

daughter, who shared his misfortunes, being received after his death into a French convent. His son, Robert Kay, invented the drop box for shuttles about 1760, and thus made it possible to weave with a succession of different colours of weft, without the trouble and delay of stopping the weaving operation and changing the bobbin in the shuttle.[1]

At the same time that Kay, the elder, was introducing his flying shuttle, other inventors were at work trying to make

[1] For further details of Kay's life, cf. Espinasse's *Lancashire Worthies*, pp. 310 *seq.*

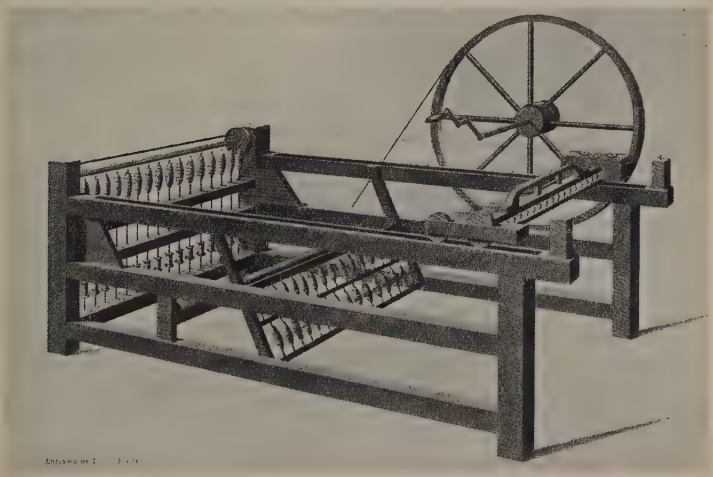
machines for carding—that is, for the first process in spinning. When the raw cotton has been picked, ginned, and prepared, the fibres are matted together and lie in all directions ; it is the work of the carding process to stretch them out and lay them side by side in a more or less parallel arrangement. This was hitherto done by hand ; inventors were early at work to do it by machinery. Some of these early inventors were Daniel Bourn of Leominster, John Wyatt of Sutton Coldfield, and Lewis Paul[1] of Birmingham, the latter two working together. These inventors conceived the idea of fixing the 'cards' on cylinders, and Bourn and Paul took out patents in 1748, the one of Bourn being the earlier of the two. Neither of these machines proved much of a success. It is interesting to learn that Robert Peel of Blackburn, grandfather of the great statesman, tried Paul's machine in 1760, and that he asked James Hargreaves to improve it or to construct a better machine. Hargreaves seems to have succeeded no better than Bourn or Paul had done, but his selection by Peel shows that he was a mechanic of some skill.

Success came to Hargreaves, however, in another direction, when he invented his famous Spinning Jenny. Hargreaves was another typical artisan inventor of his time. He was probably born at Stanhill, near Blackburn, and in the years between 1740 and 1750 we learn of him as a carpenter and hand-loom weaver ; his wife did the spinning, as was the custom among the women artisans of the time. Sometime probably in the year 1764 Hargreaves was watching his wife at the wheel, when the latter was thrown by an accident from a horizontal to an upright position. The wheel and the spindle continued to revolve, and this suggested to Hargreaves the idea that a number of upright spindles might be erected side by side and that a number of threads might be spun at the one operation. His skill as a carpenter enabled him to work out the idea, and he made a practical

[1] A further interest attaches to Paul, as he was an acquaintance if not a friend of Dr. Johnson in his early days, when Johnson was living at Birmingham and doing his first literary task work for Warren, the bookseller. Cf. Espinasse, pp. 338 *seq.*

machine with eight spindles and called the machine 'Jenny' in honour of his wife, whom he has thereby made famous. He could thus produce eight times as much yarn as before, but the number of spindles did not stop at eight; it rose to twice that number by the time he took out his patent in 1770, later to twenty and thirty, and by and by to 120 spindles.

In Hargreaves' invention the first principles of the hand spinner were strictly followed. The eight spindles were set in



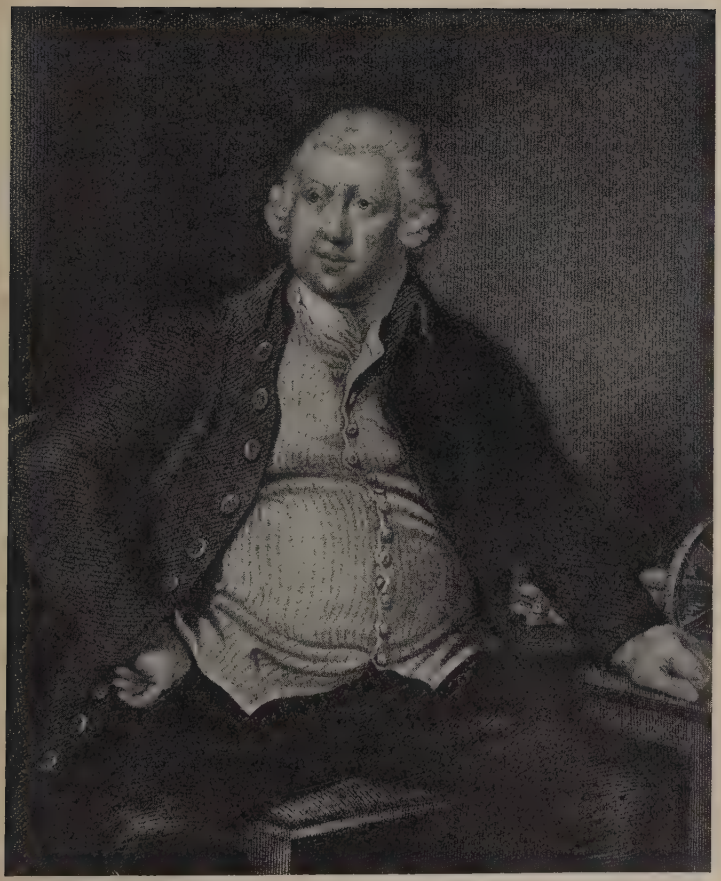
HARGREAVES' JENNY

motion by a wheel, and the action of drawing (which had been guided by hand) was imitated by a moveable carriage containing a horizontal clasp through which the rovings passed to the spindles. The threads were thus drawn out and twisted more evenly than they had been done by hand. Hargreaves worked the machine secretly in his own house for a time, but his neighbours found that he was spinning an increased quantity of yarn, and in 1768 they attacked his house and destroyed his 'Jenny'. This was a repetition of what had happened to Robert Kay in 1753. Hargreaves removed to Nottingham, and there, in

partnership with a Mr. James, quietly went on with his work till his death in 1778. It may have been partly the spinning-jenny riots at Blackburn that made the elder Robert Peel remove his works to the Irwell Valley; at any rate he did so soon after the events just narrated. The invention of Hargreaves was, to a certain extent, the forerunner and foundation of the more successful 'mule' of Crompton.

While Hargreaves was working out his spinning jenny, another Lancashire artisan was at work thinking out the problem of making a mechanical spinning frame. This was Richard Arkwright, who was born at Preston in 1732, the youngest of a family of thirteen. He received little education, but was apprenticed to a barber at Kirkham. At eighteen years of age he removed to Bolton and set up in business there as a barber, shaving at a penny and cutting hair at three-halfpence each. Here he heard much talk of the inventions of Kay of Bury and of the need for improved spinning machines, and his active mind soon led him to take up the problem in earnest. He found a clockmaker and mechanician named Kay (not the Kay of shuttle fame), and the two began their experiments. To carry these out required money, and Arkwright was hard put to it to raise enough to keep things going. He began to collect human hair and to make wigs, which were fashionable in those days; he invented or acquired the secret of a hair dye, which he sold in the districts round Bolton.

As he travelled about with his wigs and his hair dye, he saw a good deal of what was going on, and he and Kay soon began to make their early trials. They removed to Preston in 1767, and secured a room belonging to the Free Grammar School. Here the first machine was set up in 1768. Its principle was that of rollers revolving at different velocities and thus drawing out the rovings. The twist in the threads was given by the revolving spindles. The spinning jenny of Hargreaves could only spin yarn strong enough for weft; the new machine of Arkwright could spin threads strong enough for warp; this was a great step in advance. Another point in favour of Arkwright's



Rich.d Arkwright

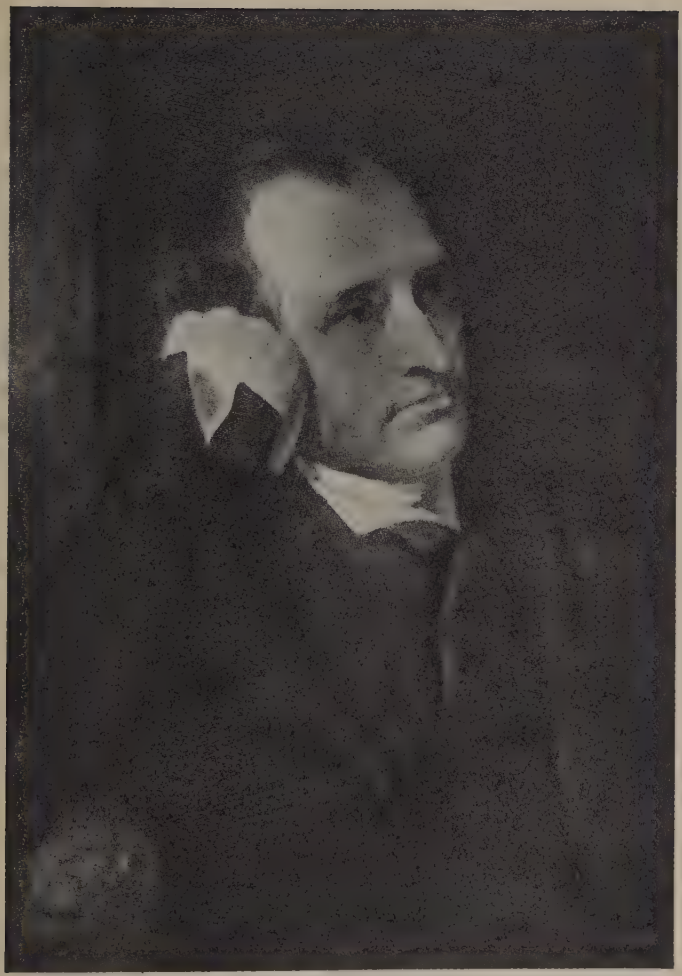
machine was that it produced yarn which was more even in thickness and more regular in twist. It was readily possible, too, to lengthen the rollers and increase the number of spindles, and so to make a vastly greater output.

No sooner had the new machine been successfully set up than there occurred the rowdy Parliamentary election of 1768 in the town. The exhibition of brute force and lawlessness seems to have alarmed Arkwright so much that he decided to take his invention to Nottingham, as Hargreaves had done the year before. Here he came in touch with Jedediah Strutt, a stocking manufacturer of wide outlook and inventive ability, and a partner in the firm of Need & Strutt. Working in conjunction with this firm, Arkwright set up the famous spinning mill at Cromford, in Derbyshire, where the power was obtained from a reliable spring of warm water which came out of the hillside, probably from an old lead mine. The machine hence came to be known as the water frame. In Arkwright's specification of his patent in 1769 he mentions horses as the motive power. In later years, when steam was applied, the name of the frame became changed to the 'Throstle,' possibly because of the humming or whistling noise made by the machine when at work.

Arkwright later turned his attention to the carding cylinder, and in 1775 invented a machine for drawing, roving and spinning —'all in one set'. In 1773 he made cotton cloth (calico) entirely of cotton warp and weft. In 1790 he introduced one of Boulton and Watt's steam engines in his mill at Nottingham. Taken all in all he was probably the greatest inventor the Lancashire cotton industry has ever had.[1]

Meanwhile another artisan genius was at work at Bolton; this was Samuel Crompton, who was born at Firwood Fold, near Bolton, in 1753. His father had there a small farm, and the family, according to the custom of the time, spent their leisure in carding, spinning, and weaving. When Samuel was five they removed to a portion of Hall-i'-th'-Wood House. This historic house may still be seen, but its name has become misleading.

[1] See also pages 91-94.



SAMUEL CROMPTON

When it was founded in 1483—the year of the murder of the little princes in the Tower—it was indeed a hall in the wood. But the magnificent oaks and beeches with which it was surrounded have long since disappeared. They were removed, to his sorrow, in Crompton's time, and he used to recount to his sons how the oaks were so large that there was no saw in Bolton long enough to cut through them, and how the woodmen were forced to cut deep slabs out of each side before they could proceed with the felling.

No sooner were the Cromptons settled at Hall-i'-th'-Wood than Samuel's father died. His mother, however, though stern and imperious, was devoted to her only son. At fourteen he was put to work as a spinner, using one of Hargreaves' jennies. At sixteen we find him a weaver, and sparing time from his loom to study algebra and trigonometry at an evening school in Bolton. He also found time to practise his beloved fiddle. His love of music was inherited, for his father had left behind him a set of tools for organ building—tools destined to be used by Samuel to construct his Hall-i'-th'-Wood wheel.

From 1763, when the Seven Years' War ended, there had been a growing demand for cotton goods, particularly for imitations of those fine muslins imported from India by the East India Company, which were becoming very fashionable for ladies. English and Scottish weavers were making great exertions to imitate these, but the yarn spun in England and Scotland did not compare with the delicate work of Hindoo fingers. Not until 1780, Robert Owen tells us, when he was an apprentice with James McGuffog, linen draper of Stamford, did Samuel Oldknow, a manufacturer afterwards almost as famous in his day as Arkwright and the Strutts of Derbyshire, succeed in producing the first British muslin, the 'Mull Muslin', an article not a yard wide, for which Oldknow charged McGuffog 9s. or 9s. 6d., and which he retailed at half-a-guinea. 'It was eagerly sought for, and rapidly bought up by the nobility at that price—and Mr. McGuffog could not obtain from Mr. Oldknow a supply equal to his demand. He was obliged to beg and pray of Mr. Oldknow

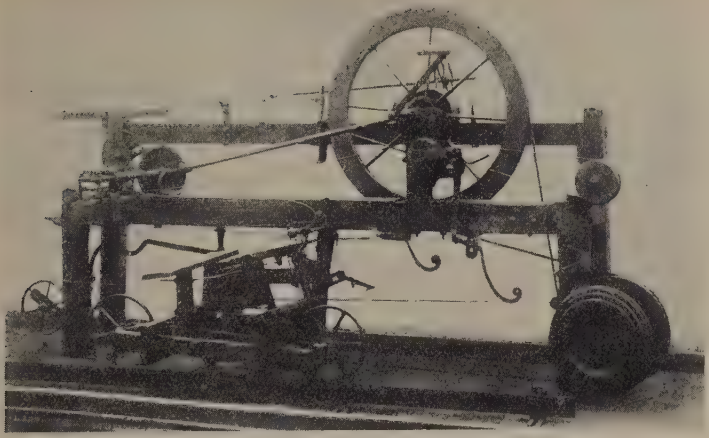
HALL-I'-TH'-WOOD, BOLTON

Photograph by Mr. A. Harper

to add a piece or two more to his weekly order for them, but frequently without success. Such is the all-powerful influence of fashion . . . a much better quality may be at this time (*i.e.* about 1850) purchased by the poor at *two pence* the yard '.[1]

Crompton was still a weaver—not a spinner. As such he resented the time hourly wasted in mending the ever-breaking threads of the miserable yarn that was obtainable. In 1774, when he was twenty-one, he set about constructing the famous Hall-i'-th'-Wood wheel. The work was fraught with difficulty. The organ-building tools were the basis of Samuel's equipment, and he added such others as he could afford from extra shillings earned by playing his violin in the orchestra of the Bolton Theatre. But shortage of tools was nothing compared with the need for secrecy. The work was done at night—and very slowly : it took five years. As it neared completion and Crompton was anxious to test it, the Blackburn spinners and weavers indulged in an orgy of machine-breaking (1779). Every jenny for miles round with more than twenty spindles was broken. Josiah Wedgwood, the great potter, ran into the rioters near Bolton when suddenly summoned to visit a little son who was sick at school there. Crompton knew only too well what would be the fate of his wheel, and turned to inventiveness of another kind. He cut a trap-door in the ceiling of the room in which he worked, and, on one occasion at all events, hearing the shouts of the rioters outside, he used it : he took his wheel to pieces and hoisted it through the trap-door into an attic. Here, hidden near the clock tower, the dismembered machine had to lie for many weeks. It was completed in 1779, and was a combination of the principles of Hargreaves' jenny and Arkwright's roller wheel. The machine had a moveable carriage on which the spindles were erected, and a pair of rollers through which the carded sliver was drawn. Crompton's machine was worked by hand for some years after he brought it out, but by the year 1790 water power had been applied to draw out the carriage and turn the frame. It was then, probably, that the name ' Mule ' was given to it, as

[1] *Life of Robert Owen*, by Himself, 1857.



CROMPTON'S MULE

CROMPTON'S ROOM AT HOPPERING BANK

it was so obviously a combination of the two machines which had been successful hitherto. The carriage was Crompton's own peculiar contribution to the machine, which has proved a most successful invention. A great point in Crompton's machine was that it correlated so completely the ideas of earlier inventors; another very important feature was that big machines could be constructed, and thus mass production received a great impetus.

Unfortunately the inventor received but little reward; he had no money with which to obtain a patent for his invention, and could only spin his yarn in secret. The yarn he produced astonished all who saw it, but he could not produce a hundredth part of the quantity demanded. The Hall-i'-th'-Wood was besieged by manufacturers wanting to buy yarn. These naturally were not content with refusals, and tried to discover the mystery of the production of this wonderful yarn. All sorts of devices were tried. Some climbed ladders to look in at the window, and one is said to have got into a loft and pierced a hole, through which to look down, in the ceiling. In a few weeks it was apparent to Crompton that he could neither spin yarn for his own profit nor keep his secret. Neighbouring manufacturers pressed to see the machine and promised subscriptions. Unwisely, but with no alternative, Crompton trusted to their promises. He had much trouble in fighting for his obvious rights, and became a soured man in consequence. Ill-luck dogged him. His petition to Parliament failed on the eve of consummation through the assassination of the Prime Minister, Mr. Perceval, who actually had that evening in his portfolio papers relating to Crompton's claim, and intended to obtain for him a grant of £20,000. Instead Parliament made him a much belated grant of £5000, a sum which he seems to have lost in unremunerative ventures. Friends in Bolton got up a subscription, without his knowledge, in 1824, and from the proceeds made him an annuity of £63. He died in 1827, and thirty years afterwards a bronze statue was erected to his memory in his native town of Bolton, where a great firm of textile machinists are proud in their adver-

tisements to style themselves—'Famous since the days of Crompton'.

'Thus nations slowly wise and meanly just
To buried merit raise the tardy bust'.

East Lancashire is very proud of those early inventors now, and would certainly like, were it possible, to make amends for the ungrateful way in which they were treated.

In 1740 the loom could far outrun the spindle; in 1780, as the result of the work of Hargreaves, Arkwright, and Crompton, the position was reversed; the possibility of yarn production had been increased a thousandfold. The loom was now in arrears, and this time the inventor who came to the rescue was not a Lancashire artisan but a clergyman from the Midlands, who had received an Oxford education. It is related that Dr. Edmund Cartwright, Fellow of Magdalen College, when staying at Matlock in 1784, fell into conversation with some merchants from Manchester, from whom he learnt something of the pressing need for a mechanically-driven loom which could keep pace with the spinning frames of Arkwright and Crompton. It is said he then visited the neighbouring mill at Cromford, was much impressed with what he saw, and went home to think over the position. The result of his labours was the first patent for a 'power loom,' taken out by him in 1785.

The machine, as at first made, was but a crude one, and *it was worked by a bull.* But Cartwright soon improved it, and in four years' time he set up a factory at Doncaster and fitted it with a steam engine. In 1791 a Manchester firm contracted to take 400 of his new power looms. Radcliffe, Horrocks, Roberts, and Johnson rapidly improved the loom, and by about 1815 it had come into fairly general use in Lancashire. By this time the work of the five great inventors was, in a sense, complete, and the Cotton Industry was ready to embark on a great era of specialisation and expansion. The old hand-spinning and hand-loom weaving were in time replaced by mechanically-driven machines, and the production of cotton goods and mixed fabrics increased by leaps and bounds. (See p. 70).

Much has been written about the hard and ungrateful treatment meted out to the inventors. But it may be doubted whether they fared worse than workers in other fields, whose genius and perseverance jolted their fellow-men out of their comfortable lethargy. The sort of novelty the world likes is a new fashion, or a new panacea, or a new song—something that, though new, demands no intellectual effort, and does not upset daily routine. Other forms of novelty, such as the poetry of Wordsworth or a change in the calendar, are always resented. The inventors' object was to obtain greater output and better results. But to achieve it they had to change the daily routine of the workers. They could not expect gratitude save from the few who would most obviously benefit, and the patent law shut off even this source of support, for no one could be very enthusiastic about that which he could not for years enjoy. The success of the machine-breaking campaign of 1779, which so alarmed Crompton and destroyed Arkwright's new mill at Chorley, was due in no small degree to the secret sympathy and consequent inactivity of the more 'conservative' manufacturers.[1] At all events the inventors had the 'joy of the working,' and often the consciousness of having added to the sum of human knowledge. One can measure what they did, but not so easily imagine to what they aspired. It was not always money that actuated them. Like their contemporary, Captain Cook, and other explorers, they

> 'saw the vision of the years
> In glory bright unfurled,
> The vanward march of pioneers
> Across a waiting world'.[2]

Nor, even in the matter of pounds, shillings, and pence, were they worse treated by their generation than pioneers in other fields. Of the playwrights contemporary with Shakespeare, for example, Greene died in debt; Lodge, to succeed in life, had to

[1] Cf. Baines, *History of the Cotton Industry*, p. 160.
[2] *Captain Cook*, by John Bernard O'Hara.

turn physician; Nash lived the scrambling, hand-to-mouth existence of the bookseller's hack; Marlowe was slain by a dagger-thrust in a Deptford tavern; Kyd was tortured on suspicion of having written a placard threatening a massacre of undesirable aliens who interfered with home industries, and though he cleared himself, lost his patrons and died within the year. Several inventors fared less badly than this. Hargreaves died worth £7000. Parliament voted Crompton £5000, and his friends did something considerable for him also. But whether their fate was hard or not, the inventors were avenged in Sir Richard Arkwright, just as the dramatists were avenged in William Shakespeare. Arkwright, like Shakespeare, achieved that form of success which never fails to be recognised as such by the 'nation of shopkeepers' to which he belonged: he made a fortune. Though never loved by the manufacturers of his own county of Lancashire—his success rather inspired jealousy than affection—he compelled the public to pay attention to the new inventions (his own and others he had co-ordinated and improved upon). It was impossible to hide the doings of a man who, almost single-handed, and in the teeth of a phalanx of hostile manufacturers, could get an Act of Parliament passed (1774) to legalise the calico he was the first Lancashire man to make entirely out of cotton yarn.[1] Like his prototype, the mediaeval clothier Jack of Newbury, he struck the popular imagination. Stories gathered round his name. Plays were written about him. The great lawsuits in which he involved himself to protect his patents and in which James Watt was one of his witnesses, added to his notoriety; and though he lost them and was, therefore, unable

[1] The 'Manchester Act' of 1736 had imposed heavy duties on calicoes—plain and printed—made exclusively of cotton, to protect the mixed stuffs made by the Lancashire manufacturers, who could not make cloths entirely of cotton. Not quite forty years later Arkwright made such calico in his new fireproof mill at Derby, and suddenly found the orders he had received countermanded, as the officers of excise refused to let his calicoes pass at the usual duty of 3d per yard, on the ground that they were really 'Indian' calicoes, though made in England.

to persist in those great projects of entering into partnership with David Dale of the New Lanark Mills and with other Scottish cotton firms, which were to give him, as he quaintly puts it with a sudden remembrance of his barber days, ' a razor with which to shave Lancashire ', he was not disheartened. Arkwright's was an organising and co-ordinating genius, and he had also great powers of concentration and unflagging industry. Well was he justified in having the busy bee included in his coat-of-arms. He began work always at five in the morning, and continued till nine at night, often working even when over fifty beyond this hour to make good the defects of his early education. The word ' success ' was written as plainly across his horoscope as it was across the horoscope of King Henry VII ; and, like that monarch, Arkwright had known adversity and chose his helpers wisely. In the days when, at Preston, he had to borrow a suit of clothes before he could record his vote for Lord Stanley's son-in-law, Colonel Burgoyne, who afterwards surrendered at Saratoga, he found John Smalley, liquor merchant and painter, and Nicholas Grimshaw, who later commanded the Preston Volunteers, to finance his experiments and procure him a room in which to try them at the Free Grammar School at the bottom of Stonygate, now the Arkwright Arms. At Nottingham he fell in with Samuel Need, and so met and joined forces with Need's partner, Jedediah Strutt, manufacturer of ribbed stockings at Derby, and grandfather of the first Lord Belper. Meanwhile in 1769, the year of James Watt's first patent for his steam engine, he not only took out his first patent for spinning-rollers, but built at Nottingham ' the first cotton mill erected in the world between Stockley and Woolpack Lane '.

We next catch a glimpse of him making a practical thing of Lewis Paul's carding-cylinder by providing it with a continuous feed, Strutt helping with the practical suggestion of rubbing the top rollers with chalk to prevent the rovings sticking to them instead of going forward as they were meant to do. Then follows the triumph of the mill at Cromford, which was capable of spinning 80's and even 100's. But, excellent as the yarn was, it

would not sell—possibly because it was still illegal to manufacture cloth entirely of cotton. So, as we have seen, Arkwright manufactured calico all of cotton from his own yarn in a fireproof mill at Derby. After his second patent was obtained, more mills were built at Belper, Chorley, and Manchester. But in 1782 Arkwright dissolved his partnership with Strutt. Three years later the Court of King's Bench gave judgment to cancel his letters-patent.

The dissolution of Arkwright's patents and the invention of Crompton's mule gave such an impetus to the cotton manufacture that during the next four years (1785-89) the import of raw cotton nearly trebled. This meant that Arkwright's rivals were forging ahead at his expense, using the machinery he had perfected, and paying him nothing in return. But he remained true to his motto, *Multa tuli fecique*—much have I endured and achieved. Nothing could shake him. He continued to drive everywhere—for speed more than for show—with four horses. He talked jestingly of buying up all the raw cotton in the world, and of paying off the National Debt, things he might almost have done had his patents been upheld, for then the Lancashire manufacturers could not have used his machines, which he could have introduced into all the Scottish mills, and, mobilising them against his rivals, obtained a monopoly. He was knighted. He amused himself building Willersley Castle in Derbyshire, and was made High Sheriff of his adopted county. He lived long enough to see the beginnings of the next era of change—one of Boulton and Watt's steam engines installed in his mill at Nottingham, Cartwright obtaining his first patent for his power-loom, bales of American cotton beginning to trickle into Liverpool; and when he died, on 3rd August, 1792, the great contest with France, that his inventions were so largely to finance, was just beginning.

Arkwright died worth half a million, having founded a county family. He neither hoarded nor wasted his wealth, nor was he ashamed of his origin. Like the great astronomer, Sir William Herschel, who, just about the time of Arkwright's death, was

visiting cotton mills in Manchester, from the insignia of his trade and his triumphs he composed his armorial bearings. This is the description of them, taken from Burke's *Landed Gentry* :

Arms.—Argent on a mount, vert, a cotton tree, fructed, proper, on a chief, azure, between two besants, an escutcheon of the field, charged with a bee, volant, proper.

Crest.—An eagle, rising, or, in its beak an escutcheon, pendant by a riband, gules, thereon a hank of cotton, argent.

Motto.—Multa tuli fecique.

V

THE IMPROVEMENT OF COMMUNICATIONS

The other phase in the tremendous expansion of the cotton and allied industries in the period from 1725 to 1845 was the development of communications; the new inventions made increasing demands on means of transport; the improvement of communications was necessary for the application of the new processes; the two phases were complementary. At the beginning of the period the means of communication were crude in the extreme; there were no canals; little systematic work had yet been done to make the few available rivers more useful; roads were a byword for their inefficiency. At the end of the first 120 years the region was already threaded with a network of canals, canalised rivers, good roads and railways. Let us now see how these changes came about, beginning with the waterways.

An Act, called 'The Mersey and Irwell Navigation Act', was obtained in 1720, the object of which was to improve and cheapen the water communication between Manchester and Liverpool. The principal work consisted of cutting straight courses across the many loops of the rivers (the Irwell more especially) and making locks and weirs. The first phase of this work was completed in 1721, and the result was an instantaneous cheapening of the cost of transport; before this time it cost 40s. per ton by road from Manchester to Liverpool; the cost by the new waterway was 10s. to 12s. per ton, or about one-fourth of the previous cost. A similar piece of work was the Douglas Navigation, the Act for which bore the same date, but which was longer in completion. The river Douglas taps the Wigan coal field, and coal became much cheaper in the growing port of Liverpool when the navigation scheme was completed, although the distance from Wigan to Liverpool is about three times as great as by road.

An important step forward was taken in 1755, when an Act

for widening and deepening Sankey Brook, near Warrington, was obtained. In a way this was the first northern canal, for in the work a considerable extent of new waterway was cut along the Sankey valley, apart from the Sankey Brook itself, which was deepened, widened and straightened only in certain parts of its course. This 'canal' was completed in 1760, and connects Widnes with Warrington, Earlestown, and St. Helens.

In 1759 there began, probably, the most momentous piece of canal-making in our history. Francis Egerton, the third Duke of Bridgewater, to whose ancestors we owe both Milton's *Arcades* and *Comus*, gave a great ball early in that year at Bridgewater House, and then, at the age of twenty-three, left London and took up his abode at the Old Hall, Worsley. An unsuccessful love affair is the explanation of this singular conduct. Eight years earlier London had been taken by storm by the beauty (still preserved on the canvas of Reynolds) of two penniless Irish sisters, Maria and Elizabeth Gunning. They were worshipped by high and low. One could not get a seat at a theatre when it was known they were to be present. 'They can't walk in the park', wrote Horace Walpole, 'or go to Vauxhall, but such mobs follow them that they are generally driven away'. The young Duke of Bridgewater was at this moment safe out of harm's way, making good the defects of a neglected education on the Continent; and Maria married the Earl of Coventry, Elizabeth the Duke of Hamilton. But in 1755 the Duke of Bridgewater was back. Two years later he attained his majority, and the beautiful Elizabeth became a widow. He fell in love with her, and was accepted. But the engagement was broken off, and the widowed Duchess of Hamilton substituted the ducal coronet of Argyle, by marrying Colonel Campbell, heir to that dukedom, for the proffered coronet of Bridgewater. Soon after the marriage was celebrated, Bridgewater House heard

'a sound of revelry by night',

and, in the morning, the Duke bade farewell to London, and never again had women about him, even as servants.

We may imagine that he would be glad to grasp at any project that would help to change his thoughts. What we know is that, in 1757, the year of his majority, not only was the Sankey Brook canal scheme under construction, but there was also a far bigger scheme to unite the Mersey with the Trent which Earl Gower, husband of the Duke of Bridgewater's only sister, was active in pushing on behalf of the Corporation of Liverpool. The Duke must, in moments when his mind was more happily occupied, have constantly heard of the scheme, and probably also of the man his brother-in-law was employing to make the survey, James Brindley. Brindley was the son of a cottar near Buxton. He had a most meagre education. All through his life his spelling was a sheer delight—'novocion' for 'navigation', 'ochilor' for 'ocular', 'Toores' for 'Tories'. But he possessed natural shrewdness, indomitable perseverance, and from the first displayed such mechanical skill that he was known as 'the schemer'. When the Liverpool plan collapsed there would be no special occasion for Brindley's services; and, in his chagrin, it is not improbable that the talk of canals, so indelibly associated with the first happy weeks of his courtship, should recur to Bridgewater's mind. The engineer was ready, in the person of Brindley: the Worsley estates themselves suggested the occasion.[1] On these estates were rich coal mines, and, as they were only a few miles from Manchester, there was a very tempting market close at hand; the disadvantage was the difficulty of carriage, which added enormously to the price. The Duke therefore determined to make a waterway connecting Worsley with Manchester, and he called in Brindley as his engineer. Brindley at once advanced some rather novel ideas. In the first place, he aimed at keeping clear of rivers altogether, thus avoiding the danger of floods—a very real danger in the East Lancashire hilly region. He wished instead to have long level stretches of water which neither droughts nor rain storms would seriously affect.

He also advised against the Duke's plan of crossing the river

[1] On the story of the Duke of Bridgewater, cf. Espinasse, *Lancashire Worthies*, Chap. XI.

Irwell at Barton, which was to go down one side and up the other by locks. Brindley's alternative plan was to carry the canal across the river by a stone aqueduct, which he proposed to make waterproof. The Duke decided to trust his somewhat original engineer and the work was taken in hand. After many difficulties the canal was opened on 17th July, 1761, and thousands of people came to see the wonderful sight. The Duke, true to his word, reduced the price of coal at Manchester from about 1s. per cwt. to 4d. per cwt., and this made a tremendous difference to Manchester in the long run, and had a mighty influence on the cotton and allied trade of that rapidly developing community.

The success of this first venture encouraged the Duke to extend his operations, and he obtained an Act in 1762 which permitted him to extend the canal to Runcorn. Brindley again, of course, took charge, and he again astonished the engineers of his day by making an embankment across the moss-land of Sale Moor, and so keeping his canal on one level for the whole distance. The Duke had the greatest difficulty in raising money for this great work. He pledged the Worsley canal to London bankers in 1765, and Brindley's wages were only £1 1s. per week. In 1772, however, the canal was completed, and barges of fifty tons went through to Runcorn and forward to the Duke's wharves at Liverpool. It is difficult for us at this day to realise what a revolution in transport had thus been achieved. A couple of mules could easily pull a barge with a load of fifty tons ; on the rough, badly kept roads of the time, it required about a dozen horses to pull such a load. Passenger boats were introduced in a few years, and as a result of the success of the venture the Duke made a great fortune, and other canals naturally followed in rapid succession.

The great canals connecting with the Midlands only concern us indirectly in this book, but they had their effect in helping forward the rapid development of industry generally, and so influenced the cotton manufacture of Lancashire. The other canals of the cotton district are our more immediate concern.

THE DUKE OF BRIDGEWATER'S AQUEDUCT OVER THE IRWELL

The Leeds and Liverpool canal was the subject of Acts of Parliament in 1766, 1769, 1783 and 1790; it connects Liverpool with Wigan, Chorley, Blackburn, Church, Burnley, Nelson, Colne, Barnoldswick, and Skipton, all of which are concerned in the cotton industry. On the other side of the Pennines it passes Keighley, famous for loom-making and for other forms of textile machinery,[1] and at Shipley it sends off a branch to Bradford, which has always been a market for mixed fabrics and for many of the finer classes of cotton goods. A branch of this canal, from Wigan to Leigh, connects with a branch of the Bridgewater canal, and so offers a through route for traffic between Manchester and the northern series of cotton towns. Another branch from Burscough connects with the Douglas Navigation, and so gives access to the Ribble estuary. This canal had a great deal to do with the development of the cotton industry in the weaving towns of the northern part of the cotton region, as may readily be seen by walking along the towing path round such a loop as the one which curves round through Burnley, and by noting the number of cotton factories of different types which have been built close to the canal. Of course the same thing may be noticed elsewhere in the cotton province, but the great bend almost following the contour line of 400 feet shows it in a remarkable degree in the case of Burnley.

The Rochdale canal was made between 1795 and 1804 and joins Manchester with Sowerby Bridge, passing through the cotton towns of Middleton, Rochdale, Littleborough, and Todmorden, and having a short branch connecting Heywood with the main canal. This canal was linked up with the Bridgewater system at Manchester and with the Calder and Hebble Navigation at Sowerby Bridge. The Leeds and Liverpool canal passes through the Pennines by the Craven Gap at a height of 500 feet, but the Rochdale canal climbs to a height of exactly 600 feet at Summit, between Littleborough and Todmorden. This climb is made by fifty-six locks on the western side, lifting the canal from about eighty feet at Manchester to the highest point; on the

[1] In those early days Keighley also made cotton goods. See p. 128.

eastern side it descends from Summit to Sowerby Bridge, where its height above Ordnance Datum is 250 feet.

The Huddersfield canal is of a narrower gauge and connects Manchester with the Calder and Hebble Navigation at a point below Dewsbury, passing through Ashton-under-Lyne on the Lancashire side and Huddersfield on the Yorkshire side. It passes under the Pennines by the Standedge Tunnel, three and one-tenth miles long, and so pierces the watershed dividing the Tame and the Colne.

Other canals which have greater Manchester—the focus of the cotton industry—as the starting-point are the short Stockport canal, the Peak Forest canal, from which the Macclesfield canal branches off at Marple, and the Manchester, Bolton, and Bury canal. The last-named came late, and had a somewhat chequered history. The proprietors decided in 1830 to convert their waterway into a railway, and obtained an Act for that purpose in 1831. They thought that the days of canals were over and that railways would very soon supplant them. In 1832 they changed their minds and obtained an Act to construct a railway by the side of the canal, except where diversion was absolutely necessary. The canal therefore remained, and the first part of the railway was opened in 1838. The passenger by train from Salford to near Clifton Junction may still see how closely the canal and the railway keep each other company.

The proprietors were so far right in their decision of 1830—that the era of canal construction in the great cotton province had by that time come to an end—that no new canals were henceforth constructed until the greatest venture of all came at the end of the nineteenth century; this was, of course, the Manchester Ship Canal—one of the greatest projects ever undertaken in Britain. The earlier barge canals had obviously much to do with the marvellous progress of the cotton region, but, as we have seen, canal construction stopped when the great railway era began. Towards the end of the nineteenth century this also seemed to have spent itself, and there were those who thought that the great business metropolis of Lancashire and district had

seen its best days. One of the factors—they argued—which hampered Manchester was the transport difficulty and the high freight charges which Manchester goods had to pay.

A meeting of Manchester and Lancashire men was held in the house of Mr. Daniel Adamson on 27th June, 1882, and the idea of a tidal waterway to Manchester was discussed. This was found to be impracticable, but the less sensational plan of a canal with locks was eventually decided upon.[1] An Act of Parliament was obtained—in the face of great opposition—and the construction was begun in November, 1887. The canal was opened for traffic on 1st January, 1894, and was formally declared open by Queen Victoria on 21st May of that year.

The total cost of construction and the purchase of the necessary undertakings—such as the Bridgewater canal—was nearly £17,000,000. The canal is 35½ miles in length, the depth, which is maintained by dredging, is 28 feet, and the bottom width is 120 feet at least, except for a length of about three-quarters of a mile. There are five sets of locks to rise from sea level to 60 feet at the docks at Manchester. There are nine docks planned (number five is not yet constructed), and number nine, the greatest of them—opened by King Edward VII in 1905—is 900 yards long by 83 yards wide. The canal is magnificently equipped with sheds, cold storage, electric and other cranes, dry docks for repairs, oil tanks, rail connections, and everything else necessary for the rapid handling of enormous volumes of shipping. Something of the growth of its trade may be seen from a comparison of the tonnage handled in 1894 (the first year) and in 1922.

1894	-	-	-	-	925,659 tons
1922	-	-	-	-	4,273,544 tons

The opening of the Ship Canal has had an immense influence upon the continued development of the great industrial

[1] Below Latchford, near Warrington, the water level is periodically raised by high tides. The three locks at Eastham are open to estuary level whenever the tide rises more than 26′ 2″ above Liverpool Bay Datum. When the tide is below this level access and egress are obtained by means of the locks.

province of which Manchester forms the centre, and now Manchester ranks as the fourth port in the kingdom. It is interesting to note that the progress of Liverpool—the great rival of Manchester—has continued in spite of the opening and the marvellous development of the trade of the Manchester Ship Canal.

During the same period of somewhat over 100 years in which, as we have seen, there was such great development in water-borne traffic, the roads were being improved, slowly at first and

MANCHESTER SHIP CANAL
No. 9 Dock

then much more rapidly ; this improvement in the roads was in itself a response to the need for greater facilities, and was also a factor contributory to the great progress of the time. The inventions and their application demanded the roads ; the improved roads made the application of the inventions much more effective.

At the beginning of the period under consideration the roads of the Pennine area were, on the whole, in a shocking condition. The well-made roads of the Romans had long since fallen into disrepair ; the monasteries had done something towards keeping them up, but after the Dissolution they hadgone from bad to worse. The first of the Turnpike Acts was passed in 1663, but the effects

had scarcely been felt in a region so remote as was East Lancashire till half a century later. Most of the traffic in the hilly regions, where the growing industry was situated, was carried by means of pack-horses. For example, from Bolton to Blackburn, and from Rochdale to Colne—where there was a wool market—this would seem to have been almost the only available method. Distant journeys also were done by pack-horses, which were used, like ships, to bring back a return freight. Guineas were carried in the saddle-bags, and dangers from highwaymen were considerable. In the bridle ways the traveller was constantly reminded by the grim spectacle of a gibbet of the risk he was running. 'When the Manchester trade began to extend', wrote Dr. Aikin, 'the chapmen used to keep gangs of pack-horses and accompany them to the principal towns with goods in packs, which they opened and sold to shopkeepers, lodging what was unsold in small stores in the inns. The pack-horses brought back sheep's wool, which was bought on the journey and sold to the makers of worsted yarn at Manchester, or to the clothiers of Rochdale, Saddleworth, and the West Riding of Yorkshire. On the improvement of turnpike roads waggons were set up, and pack-horses discontinued; and the chapmen only rode out for orders, carrying with them patterns in their bags. It was during the forty years, 1730 to 1770, that trade was greatly pushed by the practice of sending these riders all over the kingdom'. Roads in Manchester itself were so bad that the hackney coaches, for which a stand was set up in St. Ann's Square in 1750, were discontinued in favour of sedan chairs; and not till 1758 did anyone actually in business set up a carriage.[1] The romance of the pack-horse has never been written. Though they encountered fully as many dangers and played as useful a part as the later stage coaches, they failed, doubtless because they carried goods instead of passengers, to strike the popular imagination. Yet the jingling of the leaders' bells and the shouts of the drivers must have been as familiar sounds in countless homesteads as the clicking of the hand-looms. The day of the pack-horse is gone, but he still passes in simile

[1] Aikin, *Description of the Country round Manchester*, pp. 183-191.

THE PACK-HORSE BRIDGE, LINTON, YORKSHIRE

A STRING OF PACK-HORSES

across the pages of eighteenth-century poetry, an emblem of unswerving faithfulness :

> 'With pack-horse constancy we keep the road
> Crooked or straight, through quags or thorny dells,
> True to the jingling of our leader's bells'. [1]

We learn something of the roads of the region round Manchester from Ogilbie's description. In 1675 John Ogilbie, 'Cosmographer Royal,' issued his *Britannia, a Geographical and Historical Description of the Roads of England and Wales*. This was edited and re-issued as a *Road Book of England and Wales* by Senex in 1719. There were three roads in the Manchester region of sufficient importance to be mentioned ; these were—(1) from London to Carlisle through Warrington, (2) Chester to York through Manchester and Leeds, and (3) Derby to Manchester. Over much of their length they were unfenced, and they obviously fitted well with the descriptions, given by Thoresby, Defoe, and others, of the roads of those days.

Good bridges were rare : the glee with which, in his *Tour*, Defoe calls the attention of the reader of his day to those he found reveals to the reader of our day how exceptional they were. Taking leave of Liverpool and rousing himself from his reverie of King William III's fleet riding at anchor in 1690 in 'the famous road of Hile Lake', awaiting the transports from Chester that were bringing the troops destined to fight at the battle of the Boyne, he turned east for Warrington, then famous for its weekly linen market of huk-a-back, 'a large market town upon the river Mersee, over which there is a stately stone bridge, which is the only bridge of communication for the whole county with the county of Chester. It is on the great road from London leading to Carlisle and Scotland, and, in case of war, has always been esteemed a pass of the utmost importance'.[2]

The best part of road travelling, alike for man and beast, seems to have been the inns, for travellers have not managed to write

[1] Cowper, *Tirocinium*, lines 252-4.

[2] Defoe, *Tour through the Island of Great Britain*, vol. iii, p. 170.

WARRINGTON MARKET PLACE
From an engraving of 1834

enthusiastically of anything else. 'The world affords not such inns as England hath', wrote Fynes Moryson in his *Itinerary*, 'either for good and cheap entertainment after the guests' own pleasure, or for humble attendance on passengers, yea, even in very poor villages'. There were inns, as Heywood quaintly put it, for every comer:

> 'The gentry to the King's Head,
> The nobles to the Crown,
> The knights unto the Golden Fleece,
> And to the Plough the clown;
> The churchman to the Mitre,
> The shepherd to the Star,
> The gardener hies him to the Rose,
> To the Drum the man of war'.

Clearly inns have not changed their names much during the last two and a half centuries. For chapmen and drivers of packhorse teams there were many Hop-pole, Woolpack, and Packhorse inns. Lady travellers Heywood consigned to the Feathers. So much for the man. Fynes Moryson completes the picture by mentioning what no man worthy of the name forgets, his beast. 'As soon as a passenger comes to an inne the servants run to him, and one takes his horse and walks him about till he is cool, then rubs him down and gives him meat. Yet I must say', he shrewdly adds, 'that they are not much to be trusted in this last point, without the eye of the master or his servant to oversee them'.

There was still little improvement in the roads by the middle of the century, and those responsible adopted the wrong policy of trying to adapt the traffic to the bad roads instead of improving the roads themselves. There is an interesting light thrown on Lancashire roads and their treatment in a pamphlet written by Daniel Bourn in 1753, *A Treatise upon Wheel Carriages*. In it he says, 'The first set of broad wheels made use of on roads in this kingdom were erected by Mr. James Morris, of Brock Forge of Wiggan in Lancashire; who having a deep bad road to pass with his team advised with me upon the subject. I mentioned the

making of the fellies of his wheels of an uncommon width ; he accordingly made his first set thirteen inches . . . and his travelling with these to Liverpool, Warrington, and other places was took notice of by some persons of distinction . . . the result was an Act of Parliament in their favour'. This was in 1750 or 1751. Later on, wheels sixteen inches wide came into use, under the impression that they would act as rollers rather than accentuate the deep 'rutts' which were everywhere ; but, as Dr. Aikin wrote in 1795 in his *Description of the Country from Thirty to Forty Miles round Manchester*, 'the use of broad and rolling wheels but increases the evil'.

Arthur Young made his famous northern tour in 1770, and he has left us vivid accounts of some of the roads. The turnpike road between Wigan and Preston was described with some vigour. 'I know not in the whole range of language terms sufficiently expressive to describe this infernal road. . . . Let me most seriously caution all travellers who may accidentally propose to travel this terrible country to avoid it as they would the devil, for a thousand to one they break their necks or their limbs by overthrows or by breakings-down. They will here meet with rutts which I actually measured, four feet deep, and floating with mud only from a wet summer. What therefore must it be after a winter ? The only mending it receives is tumbling in some loose stones, which serve no other purpose than jolting a carriage in a most intolerable manner. These are not merely opinions but facts ; for I actually passed three carts broken down in those eighteen miles of execrable memory'. (*A Six Months' Tour in the North of England*, vol. iv, p. 431.)

There was much more to the same effect about the road to Warrington, the one to Altrincham ('if possible worse than that to Preston'), the Derby to Manchester road, and the road to the north-east. To corroborate this very dark picture we may quote from *Williamson's Liverpool Memorandum Book* for 1753, wherein we read 'No wagon or coach from the south could get nearer Liverpool than Warrington, owing to the state of the roads'.

Meanwhile, that wonderful Yorkshire genius, John Metcalfe, or 'Blind Jack of Knaresborough', had begun his great work of road making in the West Riding of Yorkshire and East Lancashire. There are many roads to this day which were planned by this marvellous blind man. Connecting the two counties is the 'old road' from Burnley through Colne to Skipton; this was one of Metcalfe's roads. Others were—Wakefield to Doncaster, Huddersfield to Halifax, Bury to Blackburn with a branch to Accrington, Bury to Haslingden and Accrington, Docklane Head to Ashton-under-Lyne, Ashton-under-Lyne to Stockport and Mottram. These roads are in the very heart of the textile region, and it is obvious that they must have had a great influence on the development of the industries therein. Most of Metcalfe's work was done between 1765 and 1795, the period of most of the great inventions which revolutionised the cotton trade first and the woollen trade afterwards.

Robert Owen and a Preston manufacturer took 'two nights and three days incessantly travelling in coaches in going from Manchester to Glasgow', in 1795, just after taking up a partnership in the 'Chorlton Twist Company'. 'The roads', he says, 'were then in a deplorable condition and we had to cross a well-known dangerous mountain about midnight, called Trickstone Bar, and which was then always passed in fear and trembling by the passengers'. This was before the days of mail coaches, and until their day 'the intercourse between the south and the north was very limited compared with the change which soon followed the introduction of mail coaches, and the consequent improvements of the roads in Scotland'.[1]

Cary's *New Itinerary of Great Roads* appeared in 1798. An official edition made under the direction of 'Thos. Harker, Esq. Surveyor and Superintendent of Mail Coaches', was issued at London in 1810. From this road book we learn that Manchester had by that time become a great centre of turnpike roads, and, that improvements must have taken place since Arthur Young wrote his drastic comments. The Irwell Valley, the Rossendale

[1] *The Life of Robert Owen*, by Himself, pp. 61-2.

REDUCED FARES
From the
CROWN INN, REDCROSS-STREET.

The Public are respectfully informed, that the

COMMODORE,

A NEW AND ELEGANT POST COACH,

HAS commenced Running from this Office, every Morning, quarter before Seven o'clock, through Preston and Garstang, to the Royal Oak and King's Arms Inns, Lancaster.

Fares to Lancaster, Inside 7s. Outside 5s.
Fares to Kendal, ditto 10s. ditto 7s.

CARLISLE Post Coach, every Morning at Eight o'clock, through Preston, Lancaster, Kendal, Shap and Penrith, to the Bush Inn and Coffee House, Carlisle, in Eighteen Hours.

WHITEHAVEN Coach, through Kendal, Ambleside, Keswick, Cockermouth, Maryport, &c. to the King's Arms Inn, Whitehaven, every Morning at Eight o'clock, Sunday excepted.

ULVERSTONE, Cartmel, Dalton and Milnthorpe Coach, every Morning at a quarter before Seven and Eight o'clock.

EDINBURGH Light Post Coach, through Langholm, Howick, Selkirk and Middleton, to the Black Bull, Edinbro', every Morning.

GLASGOW Post Coach, through Ecclefechan, Lockerby, Moffat, Elvanfoot, Douglas, Hamilton, to the Trongate Inn, Glasgow, every Morning at Eight.

YORK and Harrowgate, the Royal Pilot, Light Post Coach, (only four inside) every Morning at Five o'clock, through Preston, Blackburn, Whalley, Clitheroe, Gisburn, Skipton, Otley, Weatherby, arrives at the Black Swan and York Tavern York, at half-past Nine o'clock, returns from thence by the same route every Morning, at Six o'clock

PORT-PATRICK and Dumfries Coach, by Castle Douglas, Newton-Douglas, Glenbue, Stranraer, to Port-Patrick, from whence a safe and immediate passage to Donaghadee, in Ireland, may be obtained, being only sixteen miles across the water.

HULL, Gainsborough, Scarborough, Whitby, Durham Sunderland, Shields, Newcastle-upon Tyne and Morpeth Coaches, every Morning at Five o'clock, also at Eight o'clock.

ROYAL MAIL to Carlisle, every Afternoon, at a quarter past Five o'clock, to the Bush Inn, Coffee-house, Carlisle,

Performed by
F. BRETHERTON, & Co.

Who are not accountable for any Box, Trunk, Parcel or Packages of any description, unless entered and insurance paid for accordingly.

Crown Inn, Redcross-street, Liverpool.

NEW POST COACH,

(Only Four Inside,)

TO LONDON,

CALLED PRINCE SAKE COBOURG,

LEAVES the above Inn every Morning at Seven o'clock, and arrives at the SWAN-WITH-TWO-NECKS, Lad-lane, LONDON, the following day, at Three o'clock precisely.

Performed by SAMUEL HENSHAW & Co. Liverpool;

Who are happy to announce, they have succeeded in establishing this Coach on the most respectable system. It performs its Journey in less time than others, not by excessive driving, but by its taking the shortest rout, and strict attention paid that no time is unnecessarily lost. Steady Coachmen and Guards are selected; and the Public are respectfully informed, that every exertion has been used to complete it a respectable, safe, pleasant, and expeditious conveyance, well guarded and lighted, and only four Coachmen.

TIME BILL,
FROM LIVERPOOL TO LONDON,
Off at Seven o'Clock.

Miles.	Time allowed. H.	M.	Towns.	Time to arrive H.	M.
18	2	30	At Warrington	9	30
12	1	35	Knutsford	11	5
14	2	5	Congleton	1	10
11	1	30	Burslem	2	40
		30	Dinner, and off	3	10
11	1	30	At Stone	4	40
22	3	20	Lichfield	8	0
		30	Supper, and off	8	30
15	2	10	At Coleshill	10	40
12	1	50	Coventry	12	30
11	1	30	Dunchurch	2	0
8	1	10	Daventry	3	10
12	1	50	Towcester	5	0
8	1	10	Stratford	6	10
		30	Breakfast, and off	6	40
27¼	4	25	At Redburn	11	5
11¼	1	35	Mims	12	40
17	2	20	London	3	0
	52	0			

To arrive in London at three o'clock precisely.

NOTE—If the above Time be not strictly kept, (accidents excepted) the Passengers are particularly requested not to give the Coachman or Guard their usual perquisite.

☞ FROM THE ABOVE INN, COACHES PROCEED TO EVERY PART OF THE KINGDOM.

Advertisements from *The Liverpool Mercury* of August 23, 1816 and May 23, 1817.

Fells, and the Ribble-Calder district were now connected by turnpike roads. As examples there may be mentioned—Preston to Burnley, Colne and Skipton, Manchester to Rochdale, Bacup (spelt Bacap), Burnley and Colne, and Manchester to Colne, *via* Bury, Rawtenstall, and Burnley. It is interesting to note that the road from Preston to Burnley crosses a river twice, the name of which is written 'Derwent' and not 'Darwen' as it is spelt to-day.

The greatest changes, however, came about 1810 to 1820, and were mainly the work of two famous Scotsmen and their pupils. John L. McAdam introduced the method of road making, which will for ever be known by his name, in the years from 1810 to 1815. He wrote his important communication to the Board of Agriculture in 1810—'Remarks on the Present System of Road Making'. His ideas that the roads should be made of granite or greenstone, broken into small pieces, and that the roads should be slightly higher in the middle than at the sides were widely carried out between 1815 and 1830, and effected a revolution in the lasting power of roads. Thomas Telford planned the routes of roads much better than had hitherto been common, and made the gradients easier. Much of his work was done at about the same time as McAdam's, and many of the 'New Roads' in the industrial region of the Pennines date from that period. In many East Lancashire and West Riding towns the older people still speak of the 'New Road', although it was made in the 20's or 30's of the nineteenth century.

Through this work, first of Metcalfe and later by the application of the principles of McAdam and Telford, the great cotton province was in 1830 possessed of a network of good roads, and as a consequence it had its share in the boom of the stage coach which characterised the early years of the century. Stage coaches ran at regular intervals between the more important towns. It is recorded that a dozen of them arrived at or left Preston each day in 1810; in 1830 the number had increased to sixty-seven. Between Manchester and Stockport at the same time there were over 100 coaches going and returning every day. This era was

killed in its turn by the coming of the railways in the years between 1830 and 1850.

The third great link in the chain of communications was that of railways, which carried further the work of the waterways and roads, dealt with hitherto. Crude attempts to run trucks on rails had been made in many places, but it was in 1825 that the first successful railway was opened—the Stockton and Darlington Railway. Even this was overshadowed by the first railway of the South Lancashire industrial region. The story of the Liverpool-Manchester Railway, of how Stephenson, the engineer, overcame the difficulty of Chat Moss, as Metcalfe had overcome Standish Common half a century before, of the triumph of Stephenson's engine, the 'Rocket', and of the brilliant opening of the railway in September, 1830—all this has been well told over and over again. The railway, as a means of transport, had definitely come to stay, and henceforth the progress of the cotton industry was intimately bound up with the development of railway communication in the great textile region.

Railway schemes followed each other rapidly in those wonderful years. In the Goldsmiths' Library at South Kensington is a specification for a railway called 'The Kenyon and Leigh Junction Railway'; this was issued on 16th October, 1829, and the engineer was John U. Rastrick, C.E. Written in pencil on the fly-leaf by his son, H. Rastrick, is the following: 'The first specification for a railway that was ever made'. This railway linked up the Liverpool and Manchester Railway with the Bolton and Leigh Railway. Other local lines followed rapidly. A Manchester and Leeds Railway was first suggested in 1825, but owing to determined opposition the Act was not readily obtained, and construction was not begun until 1837; the part from Manchester to Sowerby Bridge was completed in 1841. The Manchester, Bolton, and Bury Railway was opened for the length between the former two towns in 1836; the extension to Bury was not made until a few years later. In the same year Liverpool was linked up with both Preston and Birmingham, which

in its turn had a direct line to London.[1] The East Lancashire Railway grew out of the Manchester, Bury, and Rossendale Railway, which was extended to Accrington, and from there to Burnley and Colne on the one hand and to Blackburn on the other. Finally, the Lancashire and Yorkshire Railway, for so many years the great railway of the cotton province, was formed by the absorption of the following railways: Manchester and Leeds, Manchester and Bolton, Huddersfield and Sheffield, Wakefield, Pontefract and Goole, West Riding Union, East Lancashire, and West Lancashire, Liverpool and Bury. By the middle of the century the whole system of canals, roads, and railways was practically what it is to-day, that is, it had taken almost exactly a century to grow up.

And now it seems not unlikely that another era may be dawning, the trend of which we cannot foresee. The barge canals are being used very little as a means of transport, and traders are loud in their complaints that the railways are neither expeditious nor adaptable enough for their needs. The result is that most of the great cotton firms of all classes have now their well organised 'fleets' of motor wagons, and some firms do practically the whole of their transport by this means. There is already a strong demand for a great new motor road to connect Manchester with Liverpool; and improvements are being made on many existing roads by eliminating sharp bends and widening narrow stretches. The outcome of it all must be left to the writer of the future.

[1] These years are also notable for the development of steam communication by sea. In 1838 the *Sirius*, the *Great Western* and the *Royal William* all accomplished voyages to New York. The *Great Western's* 'time' was fifteen days. Two years later the Cunard line of steamers was established, and steam communication between Liverpool and New York became a regular thing.

THE SANKEY VIADUCT
From an engraving of 1831

VI

THE INDUSTRIAL REVOLUTION

§ 1

Though industry was carried on under the Domestic System till well on in the eighteenth century, the change which culminated in what is known as the Industrial Revolution can be traced back to the year 1641, when a strong monarchy, ruling for all classes alike, and backed by an efficient Privy Council composed of members one might regard as 'professionals', came to an end. After the decay of the gilds, industry had been settled on traditional lines by Elizabeth's great minister, Lord Burleigh. He had safeguarded craftsmanship by discouraging machinery and imposing apprenticeship. The J.P.'s were given the duty of fixing wages at a fair level. Provision was made for Poor Relief. In short, Burleigh codified the industrial system that had grown up. But when the strong monarchy disappeared, there disappeared with it the executive that was essential to work the system. Neither then nor two hundred years later had Parliament the machinery to control industry; and both the Restoration of 1660 and the Revolution of 1688 tended to put political power into the hands of the class that perhaps least understood industry, the landowners.

Little change, however, was visible for a considerable time. Transit was as slow and probably slower than in Roman times. England had no roads worthy of the name till, in 1745, General Wade was forced to construct some—helping himself liberally to stones from the Roman wall in doing so—for military reasons. As the couplet has it,

> 'Had you seen these roads before they were made,
> You would hold up your hands and bless General Wade'.

The country as a whole was not supplied with good roads capable of bearing heavy traffic till the railway era was dawning. The canal era did not begin till 1760 : the Duke of Bridgewater's and James Brindley's scheme for a canal from Worsley to Manchester received sanction from Parliament in the great ' year of victories ', 1759. The years 1700-1760 were prosperous years, years of good harvests (for the weather is a factor to be reckoned with in history). The working classes had attained a certain position, a position of comparative comfort. If the old Tudor trade policy had gone to sleep, it still stood unrepealed on the Statute Book and gave a feeling of security, and, with the help of much successful smuggling, life had its interests and there was a fair degree of freedom. The England of 1725 which Defoe paints in his *Tour Through the Whole Island of Great Britain* is a prosperous, happy country. If in that year gin-drinking was introduced from Holland and produced that ugliness that is too faithfully depicted by Hogarth, the bulk of society was little affected. It was the England of Handel, and of Johnson, Richardson, Fielding, Goldsmith, and Gray, as well as of Hogarth. The basis of life was still custom, not as it became later, competition. It was settled for you that you were to work ; that was good for the State. You were told what to work at, and the place in which you were to work (for the Settlement Laws bound all men to a parish). And, like Mr. Kipling's Tomlinson, you had to learn that

> ' The race is run by one and one and never by two and two,'

for you were not allowed to combine or form unions to raise wages. But then, on the other hand, in theory there was no need, for just wages were fixed for you, and the system of apprenticeship prevented the supply of labour in your trade from being overstocked or diluted.

All this, however, was what was possible. Even before 1760 it was not by any means always actual. The Elizabethan regulations about apprenticeship applied only to corporate towns, of which there were about two hundred. They did not affect mere ' villages ', like Manchester or Birmingham. The J.P.'s allowed

the duty of fixing wages to lapse. At first they merely endorsed them from year to year, whether prices rose or not. Then they seldom did even that. As conditions changed more and more and they were appealed to, they still did nothing. One must not blame them too severely. They were only human, and the new problems baffled the best brains in the country. It is true that at first efforts were made by the State to carry out its obligations. The earliest eighteenth century Statute against combining, which forbade the London Tailors to combine (1720), fixed at the same time their wages and their hours of work. The system of 'Truck', whereby the clothiers in Somerset were made to take some of their wages in goods, was likewise forbidden by Parliament five years later, when it pronounced the union they were forming to be illegal. But other early strikes, like those of the Nottingham stocking makers, the Sheffield cutlers, the Cotswold weavers, and the Manchester tick-makers proved that the J.P.'s had abandoned their obligation to fix wages; for if they had fixed them the strikes would have been unnecessary. So the unfair position arose of Parliament on the one hand doing nothing to see that a fair rate of wages was fixed, and on the other, by forbidding the workers to combine, preventing them from attempting to secure a fair rate for themselves.

As the eighteenth century advanced the picture becomes more difficult to grasp. The currents and counter-currents grow bewildering. With the advent of machinery and improved means of communication industry changed. But industry vitally affects the lives of people, and so society was changed. Even the map of England was changed, for the North instead of the South became the most populous part of the country.

Machinery took the place of handwork.

Large production took the place of small.

Speculative trade—with periods of depression when it speculated unwisely—took the place of self-sufficing production.

Instead of the master workman came the capitalist employer.

Processes were specialised till the workman lost all feeling of being the maker of something, and with specialisation came

localisation : Macclesfield made buttons ; Witney made blankets ; Bridport made hemp.

The cottage was replaced by the slum dwelling ; the country, after the use of coal and steam began, by the town ; the workshop by the factory.

For the local market came the central exchange.

The pack-horse gave way to the barge and the railway train, the sailing ship to the steamer.

And with the factory bell and the hooter the workman felt that he was no longer master even of his time.

In short, 'when the weaver in Oldham or the cropper in Halifax or the woolcomber in Bradford looked back in 1820 or 1830 to the beginning of his life, he thought he could remember a time when the worker was in all senses a free man'.[1] He couldn't, for he had not even under the Domestic System been a free man. And for that matter none of us are free men. But the contrast between the Domestic System and the Industrial Revolution in the years 1806 to 1846 was as great as that. 'The slowly dissolving framework of mediaeval industrial life', says Arnold Toynbee,[2] 'was suddenly broken in pieces by the mighty blows of the steam-engine and the power-loom. With it disappeared like a dream those ancient habits of social union and personal affection which had lingered on in the quiet homesteads where master and apprentice worked side by side at the loom and in the forge. Industry was dragged from cottages into factories and cities ; the operative who laboured at the mill was parted from the capitalist who owned it ; and the struggle for the wealth which machinery promised withered the old bonds of trust and made competition seem a new and terrible force'. The apprentice who married his master's daughter had long been a legend. But the master who had to flatter his spinners and make them little presents to get enough yarn for his weavers was a living memory. In the atmosphere of the factory these refreshing human relationships vanished.

[1] J. L. and Barbara Hammond, *The Skilled Labourer*, p. 2.

[2] *Industrial Revolution*, p. 226.

The England of the first half of the eighteenth century was an agricultural England. Save for a few bankers and money-lenders the wealthy were the owners of the land: even as late as 1802 agriculture was producing half of the national revenue. Trade either remained stationary or was improving. While imports between 1688 and 1740 showed little change, exports doubled—a sure sign of prosperity. The National Debt, which stood at a million in William III's reign, had only risen to five millions at the outbreak of the Seven Years' War (1756). And, though England had one great industry, cloth-making, and possessed a gold-mine in her carrying trade, she was still a small country. At no time in the eighteenth century would English statesmen have dreamed of fighting France, whose population of 15-20 millions was more than double that of England, single-handed. In spite of the introduction of gin-drinking, the earlier half of the century was a period of moderation and of leisure. Politically, by the end of Pitt's great administration (1763) a point of international eminence was reached to which England had been a stranger since the time of Cromwell. Moreover, fields other than fields of battle could boast noteworthy achievements. In 1759, that 'year of victories' when British arms were so successful that, as Horace Walpole observed, one had to be careful to read one's news sheet regularly for fear of missing a victory—in that year, which saw the birth of the younger Pitt, the laying down of the keel of Nelson's *Victory* and the death of Handel; when Sterne was beginning *Tristram Shandy* and Hume engaged in writing his *History of England*; when Gibbon, in charge of French prisoners on Salisbury Plain, was meditating his *Decline and Fall of the Roman Empire*; when Adam Smith swam into fame by the publication of his *Theory of Moral Sentiments*; when Burns was born and Collins died, and Dr. Johnson was writing *Rasselas* to pay the expenses of his mother's funeral—in that year John Smeaton built the first stone Eddystone Lighthouse, James Brindley projected the first successful canal, and Joseph Black, born the year after Newton's death, and now, at the age of thirty, perfecting his discovery of latent heat, was on the

point of conferring with young James Watt, who in Glasgow University was busy repairing a model of Newcomen's engine which belonged to the Natural Philosophy Class.

Such was the year which heralded the Industrial Revolution. For the Industrial Revolution is generally considered to have begun in 1760,[1] the year of George III's accession, the year when the first furnace was blown at Carron, and to have lasted eighty years. But the glory was one-sided. The Seven Years' War, with the wars that were to follow, began a period of unrest so constant and so serious that economic conditions lay at the mercy of political causes. The Seven Years' War had scarcely ended before strained relations with America began. A disastrous war followed, and before there was time to recover from this, the Revolutionary and Napoleonic Wars were upon us. These alone lasted nearly a quarter of a century (1792-1815), and left such confusion in their train that another quarter of a century, *i.e.* 1815-1840, passed before conditions of living became normal. No true picture of the Industrial Revolution can be painted which has not for its background the grey overhung sky of these incessant wars. As one surveys these eighty years one should never lose sight of the constant pre-occupation of the Government with external affairs, the ever-rising flood of the nation's debt, the lurid shadow of 'Boney', as things neared the crisis, darkening Europe from East to West, and after Waterloo the terrible confusion and disillusionment of the Peace.

The Industrial Revolution began badly with a rise in the cost of food. In 1762 food riots took place in Manchester in which people from Oldham and Saddleworth joined. In 1764 the Government instituted an inquiry into the high prices. But from 1765 to 1775 there were ten years of bad harvests. In 1767 there were food riots in Derbyshire, and Manchester and Salford set up Agricultural Societies for the purpose of improving the output of wheat.

We get a glimpse of Manchester at this time (1771) in the pages

[1] So far as such a great movement can be said to have begun in any one year.

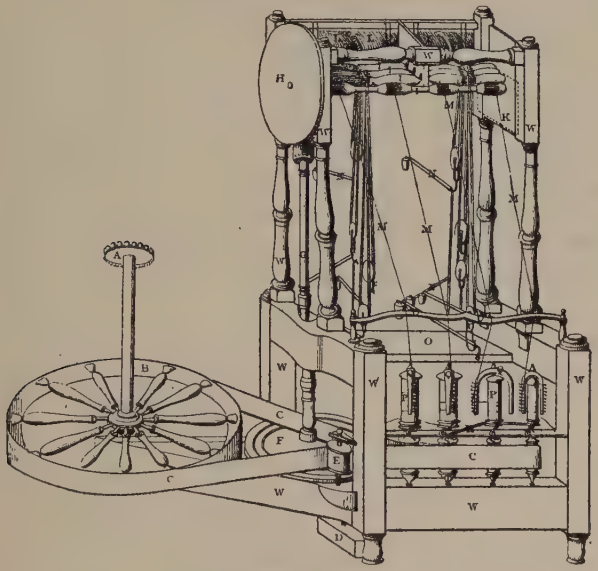
of Arthur Young's *Northern Tour*. The manufactures were divided into four branches—the fustian, the check, the hat, and the worsted small wares; and Arthur Young, a careful observer, estimated that three-quarters of them went to America.[1] All sorts of cotton were used, but chiefly the West Indian. Business had been brisk during the Seven Years' War, but very bad after the Peace. By 1771 it had recovered somewhat, though it was not equal to what it had been. 'All the revolutions of late in the N. American affairs are felt severely . . . by every workman. None ever offered for work but they at once had it, except upon the regulations of the Colonies cutting off their trade with the Spaniards, and the Stamp Act. The last advices received from America have had a similar effect, for many hundreds were paid off in consequence of them'.[2]

Meanwhile the use of machinery was making headway. John Kay of Bury had by 1738 invented the flying shuttle—a shuttle that was sent backwards and forwards by means of hammers worked by strings—and had thus speeded up the process of weaving. In 1754 the London Society of Arts was established, and soon formed a practice of offering money premiums to successful inventors. On 16th March, 1761, for example, being impressed with the difficulty the spinner now had to keep pace

[1] How the fustian manufacture grew out of the older 'worsted small ware' trade—comprising such things as laces for women's bodices, etc., and known collectively as 'Congleton points', is thus explained in *A Description of Manchester and its Manufactories* in 1783, by 'A Native of the Town'. 'To the manufactory of laces, incles, tapes and filleting, the fustian trade has been added first as an auxiliary, and then embraced as a principal, where there was capital to support it; and indeed it may be affirmed, that the frequent novelty, the variety of patterns, and great perfection of the numerous articles in this branch of the Manchester manufactory, furnish a sufficient range for the employment of very large capitals, since the present method of dressing was brought to perfection'.

[2] Letter XVIII. Raw cotton, like sheep's wool, undressed flax, dyewoods, sealskins, and other materials of manufacture came in duty-free, if properly entered at the Custom-House. Cf. Adam Smith, *Wealth of Nations*, Book IV, Chap. VIII.

with the weaver, they issued the following advertisement : ' For the best invention of a machine that will spin six threads of wool, flax, hemp or cotton at one time, and that will require but one person to work and attend it (cheapness and simplicity in the construction will be considered part of its merit) ; for the best, fifty pounds ; for the second best, twenty-five pounds.' [1] Five



ARKWRIGHT'S MACHINE
For explanations see the list of illustrations

machines were sent in. They did not come to anything, but three years later James Hargreaves of Blackburn produced the spinning-jenny, whereby, by means of a belt attached to the wheel, at first eight and ere long an hundred spindles could be worked simultaneously. Five years later Richard Arkwright of Preston improved on Hargreaves' invention, and in 1785 the Rev. Edmund Cartwright, Fellow of Magdalen College, Oxford,

[1] Quoted in Espinasse, *Lancashire Worthies*, 1874, p. 319.

and ' brother of the celebrated Major Cartwright ', invented the power-loom ; the famous French chemist, Berthollet, discovered the bleaching qualities of chlorine, and a Scotchman named Bell invented the method of printing calico by means of cylinders.[1]

One of the causes which had acted as a stimulus to invention in the eighteenth century was the ' gaping market ' which the successful wars of its earlier years threw open to British manufactures. Gibraltar gave access to the Mediterranean. The Methuen Treaty of 1703 (in return for a preference on port wine, thence for many years known as ' Methuen ') opened up Brazil. The Treaty of Utrecht partly opened the Spanish market of Central and South America. There was also the Indian market, and the markets of North America, and access to the German market through Hanover and Bremen. England had never had such a market, and all through the century there was no competitor. To meet its needs she had, till the inventions came,

[1] Baines, *History of the Cotton Manufacture*, p. 265. By this time the printing branch (see Note on p. 63 above) was definitely fixed in Lancashire. In the *Description of Manchester* in 1783, by ' A Native of the Town ', it is explained thus :

' Several circumstances have concurred to fix the printing branch here. A principal one was, that cotton greys and callicoes are manufactured in these parts, and the London printers were supplied from hence by land carriage. The printing them here saves that expence, besides this advantage, the rent for bleaching ground is lower and there is cheaper living for workmen in the country ; which brought down a succession of capital artists in this branch, who not only instructed others, but also added to their former experience by printing upon grounds, which the dyers followed with other shades ; and hence there was a communication of nostrums and chymical secrets between printers and dyers, to the advantage of both branches in the farther perfecting of grounds, and giving a firmness with a clearness to colours. These improvements soon left the London printers nothing to rival us with but the light airy patterns, upon which we are making a considerable progress, with the advantage of darkening what is deficient, or penciling and grounding them afresh, as best suits the pattern ; add to this, the large capitals employed to secure these improvements : as a proof of which the duties may be referred to, one single house concerned in printing, having paid 26000 pounds duty in a year, as it is generally reported.'

only primitive means of production ill-calculated to respond to sudden calls.[1]

The machines were simple enough things at first. In the earlier period of the Industrial Revolution, when they were driven by water power, or by horses, mules, donkeys, and even by men, they were made largely of wood. Each manufacturer made his own: there were no professional engineers. In Johnson's *Dictionary* the meaning assigned to the word 'engineer' is 'one who directs artillery'. As late as 1789 Robert Owen records that when he was persuaded to set up in partnership with a manufacturer (called Jones) of wire frames for ladies' bonnets, who kindled his imagination by tales of the 'great and extraordinary discoveries that were beginning to be introduced into Manchester for spinning cotton by new and curious machinery', they 'had shortly about forty men at work to make machines', and 'obtained wood, iron and brass for their construction upon credit'. Owen confesses that he 'had not the slightest knowledge of this new machinery—had never seen it at work'. Yet they made 'what are technically called "mules" for spinning cotton, sold them, and appeared to be carrying on a good business'.[2]

Machines were the outward sign of what was new, and were therefore resented. The real cause of the rise of prices and of the growing discomfort of life lay deeper. The temporary crises with the markets of Hamburg and Amsterdam that followed the Peace of Paris, 1763, were just tided over when trouble with the American Colonies began. This trouble was far more serious. The Colonies had become extensive receivers of English manufactures. They paid for these manufactures by exports of their own produce, and fish, to the West Indian planters. The passing of the Stamp Act in 1765 broke the circle of trading, and caused both dislocation and uncertainty. This went on till war broke

[1] Morris and Wood, *The Golden Fleece*, p. 133.

[2] *The Life of Robert Owen*, by Himself, pp. 30-32. He also mentions that the word 'factory' was at this time coming into use. It is, of course, an abbreviation of 'manufactory.'

out, and then grew worse ; for as soon as Spain entered the war manufacturers were forbidden to export to that country and its dependencies. In 1780 the Lancashire cotton manufacturers sent a petition to Parliament complaining of extreme distress, and recording a decline in the industry for several years.[1]

The labourer was becoming much less comfortable than he had been about 1750. He was conscious that, whichever way he looked at it, his standard of living had changed for the worse. A steady revolution was going on in agriculture, whereby the breeds of cattle were improved almost beyond belief, and scientific knowledge was applied to agriculture. We must be on our guard against exaggerating, for some counties, like Cornwall, never had the open field system ; others, like the counties round London, together with Cheshire, Shropshire and Gloucestershire, were already 'enclosed' in 1700 ; while the Fens, long useless, passed direct into private ownership when they were reclaimed from the water. But the great corn-growing area was unenclosed when the eighteenth century began—a great belt extending from Berkshire to Norfolk and from Wiltshire to Yorkshire. The enclosures of the eighteenth century, the hundred Enclosure Acts passed before 1750 and the three thousand which followed in the next sixty years, changed the whole face of this great belt. In these twenty counties, as the church registers show, the old yeoman families, who had farmed their own acres for generations, disappeared, and the land passed into fewer and fewer hands. Like the Egyptians in the days of Joseph, 'they sold every man his field, because the famine prevailed over them : so the land became Pharaoh's. And as for the people he removed them to

[1] This is borne out in an interesting account of *Manchester and its Manufactories*, by 'A Native of the Town' in 1783. Not only were large stocks of figured goods called 'draw-boys' (from the looms on which they were woven) left on the hands of the makers through the stoppage of trade with America, but 'the unhappy contest with America had interrupted the intercourse with Africa', where the trade in 'slight goods' for the negroes was just being wrested by Manchester manufacturers from the East India Company, who had till then supplied the negroes with cottons brought from India.

cities '.[1] In like manner thousands of cottagers tramped away to the new centres of industry that were springing up, and supplied the textile manufacturers with cheap labour.

This in itself was new. Till 1760 industry, which we think of to-day as essentially concerned with towns, was rural. Factories themselves began by being rural. Until steam power was discovered they were set up near streams which afforded good water

The challenge given by Mr. COKE of Norfolk, at the late ſheep-ſhearing at *Woburne*, to the Leiceſterſhire breeders, with a view to aſcertain the comparative excellence of the *new Leiceſterſhire*, and the *South-Down* breed of ſheep, was not, as has been falſely ſtated, in all the papers, refuſed by the latter. On the contrary, the Leiceſterſhire breeders told Mr. COKE, that if he would reduce his propoſition to writing, ſo that it might be clearly underſtood, and all poſſibility of evaſion avoided, they would willingly ſtake *five hundred guineas* on the ſuperiority of their own breed. This Mr. COKE declined, and in a manner that evidently ſhewed he was convinced that the ſuperior excellence of the *South-Down ſheep* was not to be ſupported.

RIVALRY IN BREEDING
A newspaper cutting of the seventeen nineties.

power for driving the machinery. Therefore in the earlier half of the period known as the Industrial Revolution the textile industry was not concentrated in Yorkshire and Lancashire as it is now. The South-Western clothing area still flourished, and survives round Stroud to this day. In the Eastern counties, though the workpeople would not have the new machinery (save the Jacquard machines for weaving, which Norwich used) at any price—a fact which was in the end their undoing—and were quite as hard hit as was Manchester by the disturbances of the American War, gallant efforts were made to keep pace with the changing

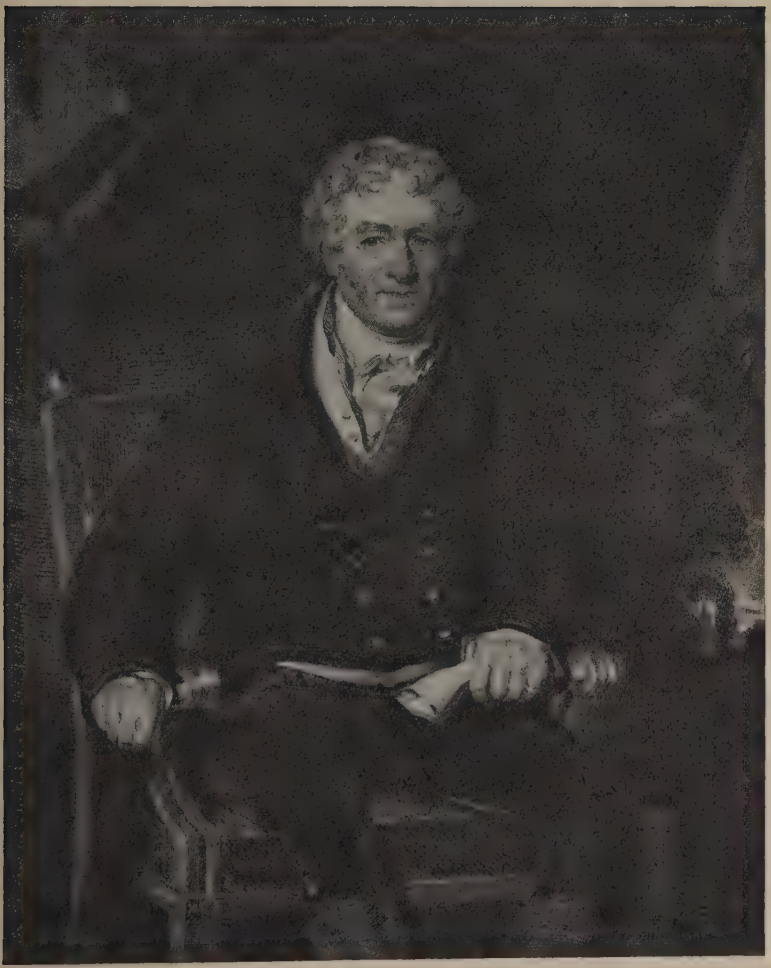
[1] Genesis xlvii. 20 and 21.

times. Cotton was introduced into Norwich in 1784, and 2000 people found employment at it. The articles made were shirtings, calicoes, checks of indigo blue and white for aprons, and cross-overs for sailors' shirts. They were in great demand, for the workmanship and the dyeing were alike excellent.

The Reverend James Woodforde testifies to both [1] in his diary for 30th December, 1780, where he records 'Nancy had her new cotton gown brought home this evening from Norwich by Mr. Cary and I think very handsome, trimmed with green Ribband —a Cotton of my choise'. The process of bleaching by chlorine gas, introduced by Michael Stark, in 1795, gave impetus to the new industry. But the Manchester weavers worked for lower wages, and though Mr. Robert Blake, the chief cotton manufacturer in Norwich, urged his workpeople to take a reduction, they refused; and the J.P.'s supported them. But the result was that the Norwich cotton industry died. Cotton however continued to be used in Norwich in the manufacture of the famous 'Norwich Shawls' and 'Fillover Shawls'—beautiful things elaborately embroidered by skilled weavers. The shawls would fetch anything from twelve to twenty guineas, and the weavers could earn from £10 to £15 a week.

Cotton was tried in other places outside Lancashire besides Norwich. When Peel's machinery at Altham was broken by a mob in 1779, he retired to Burton-on-Trent. Keighley had its first cotton mill in 1780, and for many years cotton manufacture was a staple trade of the town. On the other side of Rumbold's Moor there were cotton manufacturers at Burley, in Wharfedale. John Horrocks, joined in partnership by Thomas Greaves and Richard Newsham, put up his first factory—the famous 'Yellow Factory'—at Preston, a town with no cotton tradition at that time, in 1791, and built his own residence in Golden Square near by. Five years later he built the Moss Factory, then the Frenchwood Factory, and, in 1799, the Canal Factory. In 1793 Mr. Buckley tried to set up a cotton mill in Manchester Road, Bradford, but was warned away by the 'respectable residents in

[1] *The Diary of a Country Parson* (1758-1781), Oxford, 1924.



SIR ROBERT PEEL

Tyrrel Street', and set up his cotton factory at Todmorden.[1] Colne—once a seat of the woollen manufacture, and such an important centre for the Skipton and Bowland area that a Piece Hall was built in 1775 with a turnover of 80,000 pieces—was invaded soon after by cotton, and manufactured a mousseline de laine with a cotton warp and woollen weft. In 1769 Arkwright set up at Nottingham, between Hockley and Woolpack Lane, 'the first cotton mill erected in the world', and had later mills at Cromford on the Derwent, Belper, and elsewhere, and sold his machines, or permission to copy them, to manufacturers scattered over eight counties. Nottingham was becoming the centre of cotton hosiery, but even Cheltenham had in 1781 a flourishing manufacture of white cotton stockings. The cotton industry was experimenting, and had not settled itself in Lancashire as it was soon to do.

§ 2

The earlier factories were less forbidding than the later. Those on the banks of streams, in rural surroundings, even lent themselves to poetical description. Erasmus Darwin, a native of Nottinghamshire, who practised as a doctor first at Lichfield and later at Derby, grandfather of Charles Darwin, describes Arkwright's factory at Cromford thus:

'Where Derwent guides his dusky floods
Through vaulted mountains and a night of woods,
The nymph Gossypia treads the silver sod
And warms with rosy smiles the wat'ry god;

[1] The petition, quoted in James' *History of the Worsted Manufacture in England*, p. 592, runs as follows:

'To Mr. John Buckley, Cotton Manufacturer, in Bradford in the West Riding of the County of York.

Take notice, that if either you or any person in connection with you, shall presume to erect or build any steam engine for the manufacture of cotton or wool, in a certain field in Horton near Bradford aforesaid, called or known by the name of the Brickkiln Field, we whose names are hereunto subscribed shall, if the same be found a nuisance, seek such redress as the law will give. Witness our hands this 23rd January, 1793'.

There are fifteen signatures—two of them of women.

His ponderous oars to slender spindles turns,
And pours o'er massy wheels his foaming urns ;
With playful charms her hoary lover wins,
And wields his tridents while the monarch spins.

First with nice eye, emerging Naiads cull
From leathery pods the vegetable wool ;
With wiry teeth revolving cards release
The tangled knots and smooth the ravelled fleece ;
Next moves the iron hand with fingers fine,
Combs the wide card, and forms th' eternal line ;
Slow with soft lips the whirling can acquires
The tender skeins, and wraps the rising spires :
With quickened pace successive rollers move,
And these retain, and those extend the rove ;
Then fly the spokes, the rapid axles grow,
While slowly circumvolves the labouring wheel below '.

In Burnley, where the old worsted trade made a gallant fight to hold its own against the new cotton industry which Sir Robert Peel was pushing in the valleys of East and North Lancashire, the substitution of the power-loom for the hand-loom had at first no evil effect. With the new cotton to fall back upon work was constant, and as the bulk of the population were weavers the factories were family concerns—' a family generally work all together in the factory or shed, the father, sons, and daughters frequently occupying twelve, twenty or more looms, all adjoining, and thus united at work as at home, all contribute their exertions, from the father and elder brothers with their three looms each, down to the little boy or girl who fills the shuttle and sweeps the floor ',[1] But all factories were not so Arcadian as

[1] Narrative of Mr. Ecroyd, of Lomeshaye, near Colne, quoted by John James, *History of the Worsted Manufacture*, pp. 633-635. Lomeshaye Mills are in the modern town of Nelson ; the firm is now Wm. Ecroyd and Sons, Ltd., and an Ecroyd is chairman of the directors to-day. The son of the Mr. Ecroyd quoted in the text was the famous Quaker, William Ecroyd, the personal friend of Bright and Cobden. In the 'seventies he was affectionately known in the Mill as ' th' owd gaffer,' and was a man of a fine old type. The son of ' th' owd gaffer ' was, of course, ' t' young gaffer.' This was William Farrer Ecroyd, member for Preston, at one time held to be ' the brains of the Fourth Party,' though that party at that time included Arthur James Balfour, now Lord Balfour. His bringing Lord Randolph Churchill to see the Mill is still remembered. The second son of William Farrer Ecroyd, Dr. William Farrer, was editor of the *Victoria County History of Lancashire.*

the one at Cromford, or so domestic as those at Burnley. There was something relentless about machinery and factories. The former made traditional skill unnecessary. The advances made by means of machinery were cumulative : there was little fear of their being lost. Men died : as long as skill was vested solely in them great care had to be taken that one generation should teach the next, that the skill which a craftsman had should be bequeathed to his trade, not buried with his bones. Machines did not die : men felt as if in the grip of a new form of Mortmain. They felt themselves held by the dead hand of the machine. There might be greater division of labour, but there was less demand for the labourer's skill. To women the spinning-wheel had been a confidante, as well as a companion. Hobnelia's helped her to find her true love :

> 'My wheel I turn'd and sung a ballad new,
> While from the spindle I the fleeces drew.
> The latch moved up, when who should first come in
> But, in his proper person,—Lubberkin !
> I broke my yarn, surprised the sight to see,
> Sure sign that he would break his word with me.
> Eftsoons I join'd it with my wonted slèight,
> So may again his love and mine unite.[1]

The machine swept away tradition, and trampled old conventions and customs underfoot. It did not even respect the Sabbath.

> 'Upon a stream washing a village end
> A mill is placed that never difference kenned
> 'Twixt days for work and holy tides for rest,
> But always wrought and ground the neighbours' grest '.

Even in the best of factories the labourer was working in a building not his own, in hours not his own. These were the two new facts.

There were other factors that reduced his comfort. Before the revolution in agriculture, though he had no political power he was a member of village society. Socially there was no great

[1] John Gay, *The Shepherd's Week* (1714).

gulf between him and the small holder or farmer. He had rights of common for his cow or his pig. With his little bit of land to work, his weaving to do, spinning for his wife and children, and his animals to tend, he could lead a life which had enough interest and variety to educate his faculties.[1] All this he lost; and by removing from the neighbourhood where his family had lived for generations, and where he knew every tree and hillock, he lost his associations and his background. Impoverished by being dispossessed—for he was impoverished even though he got quite a good price for his eviction—the system of taxation hit him harder. Most of the revenue in the eighteenth century was raised by Custom and Excise. Both were indirect taxes, the Customs levied at the ports and as old as the hills; the Excise, dating from 1643 (the 'Devilish Dutch Excise' as it was at first called, though by Walpole's day France was given the credit of having invented it), levied within the country as the goods came out of bond. Indirect taxes are very convenient, but being levied on things all require they hit the poorest most hardly. From 1756 onwards taxation rose heavily: the constant war is enough to account for it; and there was no income tax, *i.e.* no 'direct' taxation, till 1798. The labourers, deprived of their bit of common and their cow or pig or geese, suffered heavily. Prices were rising. Thus, even if nominal wages rose, real wages fell, for the reason that the money would not go so far when you came to buy food and clothes with it. The poor rates soared up and up. Until the middle of the century (1750) they had been below seventy thousand pounds. In 1785—the year when spinning as a domestic industry had received its death-blow—the poor rates stood at two millions. Ten years later the Berkshire Justices

[1] Cf. Robert Louis Stevenson in *The Wrecker*, Ch. XV. 'The dull man is made, not by the nature, but by the degree of his immersion in a single business. . . . More than one-half of him will then remain unexercised and undeveloped'. It is a mercy that, since a high degree of division of labour had to come, machinery came with it, for to machines have been transferred the minutiae of the processes of specialisation. Many men and women would otherwise have become mere tools.

met at the Pelican Inn at Speenhamland, near Newbury, and did the thing thoroughly. Parliament followed their lead next year. Henceforward till 1834 the worker, to raise his earnings to a living wage, looked to the dole. Apart from the effect such relief had on him and his self-respect, it lowered quite as much the self-respect of the average employer, for he no longer thought it his duty to pay adequate wages, and in a sense counted on the dole as much as did the wage-earner.

By its decision to enable people to live by sanctioning outdoor relief Parliament departed from the new principle of *Laissez faire*, or ' do nothing,' which Adam Smith was supposed to have advocated in his *Wealth of Nations*, and which the philosopher, Jeremy Bentham, urged in his fragment on Government, published the same year, the year of the American Declaration of Independence, 1776. Bentham's principle was that every man is the best judge of his own interests—a principle that to-day sounds like a theme for a debating society. Sir Henry Maine goes to the root of the matter, when he blames Bentham not for his cynicism about men's hearts but for his optimism about their heads. He did not so much overrate their selfishness as underrate their intelligence.[1] At all events the doctrine held during the Industrial Revolution, and, if it made possible vast production by new

[1] It is interesting to recall that almost at this very moment (his *Reflections on the French Revolution* appeared in November, 1790) Burke was instructing his countrymen as to the rights of man.

' Far am I from denying in theory, full as far as my heart from withholding in practice (if I were of power to give or to withhold) *the real rights of men*. In denying their false claims of right, I do not mean to injure those which are real, and are such as their pretended rights would totally destroy. If civil society be made for the advantage of man, all the advantages for which it is made become his rights. It is an institution of Beneficence ; and law itself is only beneficence acting by a rule. Men have a right to live by that rule ; they have a right to do justice ; as between their fellows, whether their fellows are in politick function or in ordinary occupation. They have a right to the fruits of their industry ; and to the means of making their industry fruitful. They have a right to the acquisitions of their parents ; to the nourishment and improvement of their offspring ; to instruction in life, and to consolation in death.

methods, it caused a great deal of suffering by checking attempts at guidance and control. You can leave things alone when they are more or less stationary. But when they are changing from month to month regulation is required to mitigate the effects of the changes; and at no time was change in every department of industry more rapid than during the Industrial Revolution.

Meanwhile the map of England was changing. That migration to Lancashire and Yorkshire, which is the most familiar feature of the Revolution, was beginning.[1] When Defoe, travelling northward in 1725, crossed the Trent, he spoke of himself as 'having passed the Rubicon'. 'The North, as a whole, down to the Industrial Revolution, retained many of the characteristics of a frontier state, a land of colonists and great adventurers, with vast undeveloped resources and great tracts of untenanted soil. What followed (the Industrial Revolution) marks the concluding phase in a long process of colonisation extending back to the dawn of history. The frontier spirit is manifest—both for good and evil—in those who led the way'.[2] In 1700 Lancashire and the West Riding of Yorkshire were not in the first twelve counties for population. Fifty years later Lancashire was fifth and the West Riding eleventh.[3] New towns were beginning to spring up,

Whatever each man can separately do, without trespassing upon others, he has a right to do for himself; and he has a right to a fair proportion of all which society, with all its combinations of skill and force, can do in his favour. In this partnership all men have equal rights; but not to equal things. He that has but five shillings in the partnership, has a good right to it, as he that has five hundred pounds has to his larger proportion. But he has not a right to an equal dividend in the product of the joint stock; and as to the share of power, authority, and direction which each individual ought to have in the management of the state, that I must deny to be amongst the direct original rights of man in civil society; for I have in my contemplation the civil social man and no other'.

[1] It continued all through the hundred years of the Revolution. In Stalybridge the influx of Irish, *e.g.*, came in 1824-5, when the population rose from 6000 to 9000. Six years later it reached 14,216.

[2] *Education and Social Movements*, 1700-1850, by A. E. Dobbs, 1919.

[3] The population of Preston in 1811 was 17,000. In 1911 it was 117,000.

and old towns to increase in size. They grew haphazard—unplanned and regardless of sanitation, and this lack of forethought and of planning has produced in parts of them what we call by the expressive word, the slum. The most recent book on Town-planning thus describes the process : [1]

> ' The procedure was always the same ; as each coalfield was developed speculators bought up the road frontages in the vicinity ; factories were dumped down on the roadside, and jerry-built cottages were run up near them, stretching in endless monotony along both sides of the road. As more were needed they were built back to back behind the first row, facing up a narrow parallel street. There was no adequate plan—the builder was his own architect, for the houses had no more design than rabbit-hutches, and the only consideration kept in view was how to crowd the largest possible number of dwellings upon the given site. If anyone had suggested that trees and grass should be spared and included in the scheme, that gardens should be provided, that the aspect of the houses should not be determined solely by the direction of the road frontage, that a site to leeward of a factory chimney or a skin yard was likely to be neither pleasant nor healthful to dwell on, that the monotony of long straight streets might be relieved by breaking the level of house frontages and varying the roof lines, that, since families vary in size, houses should do so, too, that finally, the segregation of rich and poor aggravated the perils of both, he would have been met by the immortal retort of Mr. Bounderby : " I know the bricks of this town, and I know the works of this town, and I know the chimneys of this town, and I know the smoke of this town, and I know the hands of this town. I know 'em all pretty well. They're real. When a man tells me anything about imaginative qualities, I always tell that man, whoever he is, that I know what he means. He means turtle soup and venison, with a gold spoon, and that he wants to be set up with a coach and six." '

But we must be careful not to judge only from our twentieth century point of view. To men living at the time there was something fine about this rapid expansion. Traffic was leisurely,

[1] *Towns and Town-planning*, by T. H. Hughes and E. A. G. Lamborn, Oxford, 1923.

and the cry of ' safety first ' had not begun to echo, with its moral of wide streets and trunk roads. Nor had experience of the inevitable spreading of a successful centre shown the need of open spaces. John Dyer, whose poem *The Fleece* appeared in 1757, gives the contemporary view :

' . . . Take we now our eastward course
To the rich fields of Burstal. Wide around,
Hillock and valley, farm and village, smile :
And ruddy roofs, and chimney-tops appear,
Of busy Leeds, up-wafting to the clouds
The incense of thanksgiving : all is joy ;
And trade and business guide the living scene,
Roll the full cars, adown the winding Aire
Load the slow sailing barges, pile the pack
On the long tinkling train of slow-pac'd steeds.
As, when a sunny day invites abroad
The sedulous ants, they issue from their cells
In bands unnumber'd, eager for their work ;
O'er high, o'er low, they lift, they draw, they haste
With warm affection to each other's aid ;
Repeat their virtuous efforts, and succeed.
Thus all is here in motion, all is life :
The creaking wain brings copious store of corn :
The grazier's sleeky kine obstruct the roads :
The neat-dress'd housewives, for the festal board
Crown'd with full baskets, in the field-way paths
Come tripping on ; the echoing hills repeat
The stroke of axe and hammer ; scaffolds rise,
And growing edifices ; heaps of stone,
Beneath the chisel, beauteous shapes assume
Of frieze and column. Some, with even line,
New streets are marking in the neighbouring fields,
And sacred domes of worship. Industry,
Which dignifies the artist, lifts the swain,
And the straw cottage to a palace turns,
Over the work presides. Such was the scene
Of hurrying Carthage, when the Trojan chief
First view'd her growing turrets. So appear
Th' increasing walls of busy Manchester,

Sheffield, and Birmingham, whose reddening fields
Rise and enlarge their suburbs. Lo, in throngs,
For every realm, the careful factors meet,
Whispering each other. In long ranks the bales,
Like war's bright files, beyond the sight extend.
Straight, ere the sounding bell the signal strikes,
Which ends the hour of traffic, they conclude
The speedy compact; and, well-pleas'd, transfer,
With mutual benefit, superior wealth
To many a kingdom's rent, or tyrant's hoard'.

The other familiar features associated with the Industrial Revolution were writing themselves across the face of northern England. Between 1775 and 1800 James Watt, in partnership with Matthew Boulton, made at Soho, between Birmingham and Wolverhampton, eighty-four of his 'fire-engines' (as steam-engines were first called) for cotton mills, though in the same period for the older and more conservative woollen industry he made only nine. After 1785 there was a great increase in the number of spinning engines in consequence of the expiration of Arkwright's patents. In the ten years 1781 to 1791 the rate of increase in the import of raw cotton was 319½ per cent.[1] The result was manifest in the changes in fashion. Men wore cotton waistcoats, while 'women of all ranks, from the highest to the lowest, were clothed in British manufactures of cotton, from the muslin cap on the crown of the head, to the cotton stocking under the sole of the foot'.[2] But if the coming of steam increased production it did not at first add to the charm of the factory.

'You know the scene: the great oblong ugly factory, in five or six tiers, all windows, alive with lights on a dark winter's morning, and again with the same lights in the evening; and all

[1] Baines, *History of the Cotton Manufacture*, p. 348. This rate, which was quite new and exceptional, was not maintained. From 1761-71 it was 25½ per cent., from 1771-81, 75¾ per cent. From 1791-1801 it fell to 67½ per cent., and from 1801-1811 it fell again to 39½ per cent. After that it rose. From 1811-21 it was 93 per cent., and from 1821-31 it was 85 per cent.

[2] *Ibid.* p. 336.

day within, the thump and scream of the machinery, and the thick smell of hot oil and cotton fluff, and the crowds of drab-faced, drab-dressed men and women and children—the mill-hands—going to and fro or serving the machines;

'And, outside, the sad smoke-laden sky, and rows of dingy streets, and waste tracks where no grass grows, and tall chimneys belching dirt, and the same, same outlook for miles. . . .

'In those days—it happens even now—whole families, father, mother and children, would go out (locking up the house behind them) to work in the Mills; thus to earn perhaps a decent combined wage'.[1]

Employment of children was not new. As we have seen, children toiled when industry was carried on under the Domestic System. Over and over again Defoe records in his *Tour* having seen children at work. But they worked at home under the eye of their parents, not in a factory under the eye of an overseer, whose own interest lay in getting as much out of them as possible. Nor were the long hours of the factory and the strap of the overseer the only new evils the new system brought them. Their mothers, too, were employed in the factory. This meant that in their early months they could not be properly tended. For mothers no longer worked at home. Thus the children were handicapped ere they had started in life's race: in their cradles the factory affected them. Then, as soon as they could toddle, to the factory they went. The effect of the life was bad enough for their bodies. Wordsworth has painted the child in the early nineteenth century mill:

'His raiment whitened o'er with cotton-flakes
Or locks of wool, announces whence he comes.
Creeping his gait and cowering, his lip pale,
His respiration quick and audible;
And scarcely could you fancy that a gleam
Could break from out those languid eyes, or a blush
Mantle upon his cheek'.

But the effect upon the growing mind was worse even than the

[1] Edward Carpenter, *Towards Democracy*, p. 452. There was a factory in Stalybridge, burnt down in 1804, which was known as 'The Bastille'.

effect upon the growing body. With a woman's intuition Mrs. Browning seized upon it :

> ' For, all day, the wheels are droning, turning—
> Their wind comes in our faces—
> Till our hearts turn—our heads, with pulses burning—
> And the walls turn in their places—
> Turns the sky in the high window blank and reeling,
> Turns the long light that drops adown the wall ;
> Turn the black flies that crawl along the ceiling—
> All are turning, all the day, and we with all,
> And, all day, the iron wheels are droning ;
> And sometimes we could pray,
> ' O ye wheels ' (breaking out in a mad moaning),
> ' Stop ! be silent for to-day ' !

' The labour of children was cheap, therefore it was sought. Plentiful as labour was owing to the changes in the ownership of land and the eviction of the smaller tenants, more was wanted, and a regular system grew up of " apprenticing " pauper children from the workhouses into the factories. " It is a very common practice ", wrote Romilly in 1811, " with the great populous parishes in London to bind children in large numbers to the proprietors of cotton mills . . . at a distance of 200 miles. . . . The children, who are sent off by waggon loads at a time, are as much lost for ever to their parents as if they were shipped off to the West Indies. The parishes that bind them get rid of them for ever, and the poor children have not a human being in the world to whom they can look for redress . . . from these wholesale dealers whose object is to get everything that they can wring from their excessive labours and fatigue ". Some manufacturers agreed to take one idiot with every nineteen sane children. William Thom's poem " The Mitherless Bairn " sounds a little mawkish and sentimental to some of us to-day. But Thom was himself an apprentice in a cotton mill in 1808, when he was ten years old, and knew at first-hand what he was talking about '.[1]

It was the time when a few of the worst mill owners used to boast that ' their beds were never cold '. No sooner were one set of miserable apprentices awakened to resume attendance on the

[1] Morris and Wood, *The Golden Fleece*, p. 153.

tireless machines than the beds they had left so reluctantly were occupied by the shift they replaced. For these wretched apprentices were mercilessly worked at night, when it was difficult to get free labourers to work. This was confessed by employers who complained against the Apprentices Act of 1802. In connection with that Act, Peel, the first baronet, showed that, like his greater son, he was man enough when in the wrong to confess it publicly. He owned that when he visited the factories he was 'struck with the uniform appearance of bad health, and in many cases stunted growth of the children.'

With conditions like these, and hours sometimes as long as fifteen in the day, it was no wonder that the 'apprentices' ran away. Desertions were frequent and advertisements in the press were an every-day thing. The following, from the *Manchester Weekly Times* of 21st November, 1792, is a specimen :

Run Away From Hodgsons Capstick & Co, at Caton Cotton Mill Nr. Lancaster 10 Parish apprentices taken out of the workhouse at Liverpool, viz.

William Moore aged 14 years, a stout made lad about 5 feet 3 ins. high, round broad face, fair complexion, light hair, had on, when he went off, a drab round-about top jacket, self grey waistcoat, a pair of trowsers and shoes tied. Ran away about a month ago.

Thomas Tyrer aged 13 years, rather round face, short brown hair, had on, when he went off, a drab coloured coat, self-grey waistcoat, a pair of trowsers and shoes tied. Ran away near a month ago.

John Tyrer aged 15 years, about 5 feet 4 in. high, dark brown hair, goes rather lame and wide with his toes, had on, when he went off, a drab coloured coat, self-grey waistcoat and white flannel breeches. Ran away four days ago.

John Young aged 14 years, about 5 feet 3 in. high, dark brown hair, had on, when he went off, a drab coloured coat, self-grey waistcoat and white flannel breeches. Ran away four days ago.

The following ran away at different dates some time ago.
Thomas Williams 17 years of age and tall for his age.

William Bevan 15 years of age, a stiff stout lad rather marked with small pox.

Thomas Kelly 16 years of age, a dull countenance, rather knock-kneed.

James M'Lauchlin 14 years of age.

Thomas Edwards 13 years of age.

Peter M'Leod 14 years of age.

Whoever will give information where any of them are or will bring any of them to John and Thomas Hodgson, Merchants, in Liverpool, or to Hodgsons Capstick & Co. aforesaid, will be paid all reasonable demands and whoever harbours or employs any of them will be prosecuted as the law directs.

HODGSON CAPSTICK & CO.

CATON

26 *October* 1792.

Luckily the employment of such pauper children was not of long duration. They were needed most in the days of water-power, when, the mills being remote, it was difficult to find labour. At the time of Peel's Bill, 1802, it was estimated that their number was 20,000. But as steam-power replaced water-power the demand for them fell, for the newer factories were built in towns where free labour was available. In 1816 an Act was passed which stopped apprentices from being sent further than forty miles from the parish to which they belonged. So the drafting of London apprentices to Lancashire came to an end.

But the other forms of child labour remained, and the hours were so long that the spinners found it difficult to keep their little piecers awake. They would fall asleep and, even in their sleep, go on performing their work with their hands after the billey had stopped.[1] In 1832 the workers from the West Riding went to York on a 'Pilgrimage of Mercy' to get shorter hours for the children, and they did secure an Act, two years later, excluding from factories children under nine, and limiting the hours of children between nine and eleven to forty-eight in the week. But Queen Victoria had been ten years on the throne before the Ten Hours' Bill became law.

[1] *Report of Commissioners*, 1833, *from Scotland*, p. 31.

'It is difficult for us to believe that Pitt could have advocated that children should begin work at the age of five, or that children should have been kept at work from 5 in the morning till 9 at night. Flogging was frequent if only to keep the children awake, and parents flogged their own children to save them from a worse flogging by the overseers. It is true that there were parents who pushed their children into the mills as early as they could. A brutal system was bound to produce brutal parents. It is true that the best manufacturers tried to improve the system, and to push the Government forward into making laws to restrict and lighten child-labour. It is true that through all the earlier part of the Revolution the country was at war and that the pursuit of wealth was a matter of national importance. It is true that after the wholesale murders of the Revolutionaries in France, England was justified in restraining all semblance of similar outbreaks at home. But all these considerations do not justify the heartless treatment of the children. It is a dangerous thing for one generation to judge another. It is easier to discover what men did than how they felt, to observe actions than to understand motives. Probably Queen Mary felt as righteous in burning Protestants as we feel when we condemn her for doing it. But whatever excuses may be made, the treatment of children under the Industrial Revolution must remain one of the blackest pages in the history of Britain. "Never lower your moral standards", wrote Lord Acton, "let no man and no cause escape the undying penalty which History has the power to inflict on wrong". It is difficult to see how any historian could acquit the Industrial Revolution, in spite of all temptations, of its brutal exploitation of these innocent little victims'.[1]

§ 3

After 1800 the Industrial Revolution took on a grimmer aspect. Its features grew sharper and its characteristics became more intense. Not only was steam replacing water-power, big concerns taking the place of small ones, but fluctuations were more frequent: there were failures which threw hundreds out of work. Food was rising to famine prices, for again there was a succession

[1] Morris and Wood, *The Golden Fleece*, p. 154.

of bad harvests, and weather is a factor in history. An impending sense of fate, of hopelessness, oppressed everyone. All, employers and employed alike, knew things were wrong, but no one knew how to better them. There were as yet no Trade Unions, nor were there Government Departments as we know them today. The Secretaryship of State for Home Affairs was created in 1782, and the Committee of the Council on Trade, established four years later, was for a long time concerned only with such matters as statistics, patents, weights and measures, and the registration of Joint Stock, Railway, Water, and Tramway Companies and Merchant Shipping : it had no machinery wherewith to settle disputes. Moreover the Government had its hands more than fully occupied in managing the war. And so gradually the old spirit in which both sides had been accustomed to meet gave way, and there came feelings of hostility and resentment. And, dominating the picture from right to left, over all hung, for the first fifteen years, the dark, lowering cloud of war, and afterwards the unsettled conditions and disappointments of the peace.

Up to 1800 the employers, almost all of them men sprung from the ranks of the workers themselves, had been small men. After 1800 arose the big employer, the capitalist as he is called—wrongly, if the name is meant to imply that a capitalist was a new kind of being, for capital, that is, money used to make more money, was not new. The Ulnage returns afford evidence of capitalists before the Tudors had set foot upon the throne. The 'clothiers' of the Domestic System were capitalists. The two new things in capital, as it came to be understood at the beginning of the nineteenth century, were, firstly, the *idea*,[1] the new idea of what it stood for, which Matthew Boulton expressed when he declared to James Boswell, Johnson's biographer, 'I sell what all men desire, Power' ; and, secondly, that capital became more fixed. Under the Domestic System the clothier laid out his capital in raw material, in pack-horses and mules to take it round to the spinners, and again, as yarn, to the weavers, and finally,

[1] Cf. John Lord, *Capital and Steam Power*, 1750-1800.

as cloth, to the market. He also owned the machines, such as they then were, and often charged the workers an exorbitant rate for their use. But the development of machinery erected in factories had the effect of ' tying up ' capital : it was definitely invested and could not easily be released. Thus the new type of capitalist was more vulnerable than the old. More of his eggs were in one basket, and it was more difficult to change the basket. And because in this sense he was weaker than his forbear, he was also harder. One never bullies unless one is afraid of something. The new capitalist, with his money tied up in his elaborate machinery, with his greater speculations and the ups and downs to which big markets are more subject than small ones, lived a life of constant anxiety.

In the early years of the nineteenth century there was enough to make the stoutest heart anxious. A truce, called the Peace of Amiens, had been patched up in 1802, but no one had much confidence in it lasting. In November Fox ventured to speak in the House of Commons of the beauties of the French constitution, but the House gave him a bad time of it. The following August the Bishop of London preached upon the critical state of the country, and urged each according to his capacity to come forward for its defence. In October the City Light Horse petitioned His Majesty to cancel the restriction which confined their services to a radius of ten miles round London. The war had broken out and fears of invasion were growing. Recruits were wanted, and it was difficult to get them owing to the numbers of men employed in the factories and as ' navigators,' or builders of the new canals. Lancashire was thought to be a not unlikely place for a landing, and from all parts of the county men responded to the call for volunteers. In 1804 Prince William, Duke of Gloucester, reviewed 4000 of them at Liverpool and 6000 on Sale Moor, near Manchester. Preston raised a volunteer battalion, which was commanded by the Nicholas Grimshaw who had helped Arkwright to carry out his experiments at the Free Grammar School. The colours of the Loyal Warrington Volunteers can be seen in the Warrington Museum to-day, and there

still hang in the chancel of Eccles Church the flags of the Trafford Volunteers. The prisons in Liverpool were full of French prisoners [1] of war. The recall of Pitt to the helm restored confidence: though not so great a War Minister as Chatham, who in himself was worth an army, even soldiers considered his mastery of military matters phenomenal. The King was deservedly popular, but the anxieties of the time were unsettling his mind. In March, 1804, taking his morning ride, he galloped so furiously and so long that he almost killed his favourite horse.[2] The Martello Towers, that remain to-day along the south-east coast, and the Hythe Military Canal still testify how imminent invasion was. Napoleon had medals already struck to celebrate it. But the British Navy foiled the attempt. On 1st September the camp at Boulogne was broken up; and the 'Grand Army' was on the Danube before, in October, 1805, Nelson at Trafalgar removed all danger of invasion for the remainder of the war. But in December the Austrians and Russians were so heavily defeated at Austerlitz that the coalition Pitt had made was broken. He was playing with some children when he received the news of the capitulation of the Austrians at Ulm, and those present were unable to detect any change in his countenance or his manner. But the news of Austerlitz killed him. Looking over a map of Europe with General Phipps to see exactly where the battle had taken place, he wearily pushed it aside with the prophecy, 'Roll up that map; it will not be wanted these ten years.' A month later he died.

One of the achievements of the heroic generation that defeated Napoleon is often forgotten. Of the two preceding wars only a fraction of the cost had been met out of taxation ($22\frac{1}{2}$ millions out of $82\frac{1}{2}$ millions in the Seven Years' War, leaving 60 millions to be met by loans, *i.e.* a ratio of $\frac{1}{4}$ to $\frac{3}{4}$; in the American War of Independence only 3 millions out of $97\frac{1}{2}$ millions, leaving $94\frac{1}{2}$ millions to be met out of loans, *i.e.* less than one-thirtieth of the cost met by taxation). The remainder had gone to swell the

[1] Cf. E. G. W. Hewlett, *Lancashire* (Oxford County Histories), p. 223.

[2] For interesting sidelights on these years, cf. *The Farringdon Diary*.

National Debt, the interest on which imposed burdens to be paid by generations then unborn. The great wars of 1793-1815 cost 831½ millions, and of this no less than 391 millions, or nearly half, were paid out of taxation,[1] in spite of the fact that the generation that was paying it was also burdened by the interest it had to find, as a result of Lord North's recklessness, for the debt on the American War. The heroic Englishmen who fought

Medals struck in advance by Napoleon to commemorate the invasion of England

the titanic struggle for freedom that ended at Waterloo refused, so far as they could, to let their descendants pay even for the outward trappings of their sacrifices.

Meanwhile, from the point of view of industry, matters grew worse. To isolate England Napoleon devised a system of carrying on war by attacks on trade. By the Berlin Decree of 1806 and the Milan Decree of 1807 he tried to shut the ports of Europe against her. 'All trade in British or Colonial goods was forbidden to the nations of the Continent, and no ship sailing from British harbours or colonies might touch the shores of the Continent. Britain answered these "Decrees" by the "Orders in Council", whereby she forbade neutrals to enter any port under French influence, threatened to blockade any port which excluded British ships, and to capture any ship whatever which carried goods to the Continent, unless they had first touched at a British

[1] Cf. *The Golden Fleece*, p. 166.

port and paid duty. Napoleon succeeded by these means in embroiling England at last in a war with the United States'.[1] The disorganisation and confusion to trade cannot easily be imagined. In 1806 and 1807 there were continual failures, like that of Mr. Watson, cotton manufacturer of Preston, who failed for nearly half a million. These were years when the cotton workers were sending in vain to Parliament petition after petition for a Minimum Wage Bill.

Out of these petitions arose the incident which is said to mark a turning point, and to have changed for the worse the feelings between employer and employed. No Minimum Wage Bill was passed, though more than a hundred master manufacturers themselves petitioned for it, and the London merchants supported it. Perceval, the Prime Minister, 'raised many objections'. Riots followed upon the rejection of the Bill, and there was a strike for a $33\frac{1}{3}$ per cent. rise in wages. Public sympathy was with the strikers, and in the subsequent Assizes leniency marked the treatment of the offenders. But, unfortunately, Joseph Hanson, a Colonel of Volunteers and a keen supporter of the measure, a man who had been a weaver himself and was the son of a weaver, was fined £100 and given six months for a brush he had had with a Captain of Dragoons at one of the monster meetings. The weavers wanted to pay his fine by penny subscriptions. When Hanson refused to have this, forty thousand of them subscribed to give him a silver cup. Lancashire is one of the most sporting counties in England, and the spirit that, a century later, sang:

'Give me the Red Rose
In all its murky pride;
Give me the Red Rose
When it *was* a County side;
Give me the Good Old Times
When cricketers played cricket;
Give me Old Trafford
With Maclaren at the wicket'—

[1] Morris and Wood, *The English-Speaking Nations*, p. 350.

felt deep resentment at the unsporting treatment of Colonel Hanson.[1]

The Government's blunder is the sadder in that only in 1799 the petition of the weavers of Stockport, Oldham, Wigan, Warrington, Blackburn, Chorley, Bury, Whitefield, and New Chapel near Leigh had been marked by its good tone.[2] It stressed 'the mutual interests of employers and employed'. Then, too, the Government did nothing. There is something pathetic in the helplessness betrayed by the Home Secretary in his note upon the document, 'Can nothing more be done in this case than calling the attention of the magistrates to the facts by a letter to the chairman of the Sessions, or some intelligent magistrate in that part of the country, which is indeed all or at least the principal part of the manufacturing district'? [3] It was difficult for the weavers to believe that a Government which regulated the price of corn and had provided for the fixing of minimum wages in the silk industry by the Spitalfields Act of 1773, was incapable of also helping them. In 1800 master manufacturers of Chester, York, and Lancashire told the Government the trouble arose because there was no power to settle wages. The Government took evidence, and a witness, when asked if it was the favourite wish in Whitefield that there should be regulation of wages, stoutly answered, 'It is not only the favourite wish in Whitefield, but the favourite wish of the four counties of Lancaster, Cheshire, York, and Durham'.[4] Whitefield and the four counties did not get their favourite wish, but a Cotton Arbitration Act (1804) was passed allowing each side to name an arbitrator, and for settlement of the matter by a J.P. if the arbitrators did not agree. But the Act had a hole in it, which was quickly discovered. There was no provision to compel either side to appoint an arbitrator. No amending Act was passed—as it easily could have been—to repair the hole, and the Arbitration Act became a dead letter.

[1] Prentice, *Historical Sketches of Manchester*, 1851; and J. L. and Barbara Hammond, *The Skilled Labourer*, p. 78.

[2] *Ibid.* p. 59. [3] *Ibid.* p. 60. [4] Quoted in *The Skilled Labourer*, p. 64.

After the Hanson incident things became steadily worse. In 1809 it was publicly stated in the House of Commons that our imports of cotton-wool had fallen off by twenty-seven millions, and that thirty-two cotton mills stood idle in Manchester. On the other hand the number of power-looms was increasing. Mr. H. Horrocks of Stockport had patented the power-loom made of iron in 1803. Ten years later there were 2,400 power-looms in the United Kingdom. By 1833 there were 100,000.

In 1811 the weavers of Lancashire and Scotland sent a monster petition to Parliament for the repeal of the 'Orders in Council'. They were beginning to feel that their demands would not be so constantly refused if they had political power, and from this time they began to look for parliamentary reform. There was a good deal of machine-breaking, not only in Lancashire, but in Leicester and Nottingham and in Yorkshire. The Luddite Riots broke out in 1812, and again in 1816. The main good they did was to influence public opinion in favour of education (better education, it was thought, would prevent such riots), though they did not originate the movement, for the British School Society had been founded in 1808 and the National Society in 1811.

The weavers, however, still had one expedient left. The Acts of Elizabeth and James I empowering the Justices to fix wages were still on the Statute-book, and attempts were made to revive them. In 1813 this avenue was closed, for the Acts were repealed: 'It did not require', fatuously remarked Lord Sidmouth, 'minds so enlightened as those of their lordships to be aware how pernicious such a state of things (as the J.P.'s fixing wages) must be both to the employer and the servant, but especially the latter'.[1] Next year trade revived for a space. But the end of the war, instead of bringing the millenium, brought confusion. While the men were away fighting women had taken their places. This was most marked in the textile industries, where a specialised class of women wage-earners had developed earliest.[2] With the

[1] *The Skilled Labourer*, p. 86.

[2] Cf. *Working Life of Women in the Seventeenth Century*, by Alice Clark, 1919.

CORRECT STATEMENTS,

Shewing the Wages, Deductions, and nett or clear amount of a Weaver's weekly labour.

Statement First.—For 6-4ths Cambrics, 60 Reeds.

Suppose a man weaves a Warp of this description, in five weeks, and receives from the master 8s. per cut, this will amount to one pound twelve shillings.

	s. d.		s. d.
His weekly receipt will be for weaving one fifth of the Warp	6 4¾	His weekly expences will be	
		Rent, (*if paid*) ...	1 9
		Fire	1 0
		Sizing Warp.....	0 3
		Looming do.....	0 3
		Size or Sowen for do	0 3
		Soft Soap, Tallow and Oil.....	0 2
		Candles.....	0 4
		Soap for family washing	0 4
			4 4

This leaves him 2s. 0¾d. to support himself, wife, and children during seven days!

Statement second.—For a journeyman weaving the same kind of work:—

	s. d.		s. d.
His weekly receipt as above, is.....	6 4¾	His weekly deductions are for loom room, &c. one-fourth, or.....	1 7
		Sizing warp.....	0 3
		Looming do.	0 3
		Candles	0 4
		Lodging, cooking, and washing.....	1 6
			3 11

This leaves him 2s. 5¾d. per week, for meat, drink, and clothing!

Statement third.—For ¾ths cambrics, 44 reeds.—Suppose an *aged man* weave a cut per week of this description, and his wife wind his picking:—

	s. d.		s. d.
Their weekly receipts for weaving and winding	4 0	*Weekly deduction, &c.*	
		Rent	1 9
		Fire	0 10
		Sizing warp.....	0 3
		Looming do.	0 3
		Size, or sowen for do.	0 3
		Candles	0 4
		Soft soap, tallow, and oil.....	0 2
		Ditto for family washing	0 2
			4 0

A cutting from *The Liverpool Mercury* of 27 December, 1816

conclusion of peace not only was the largest of buyers, the Government, withdrawn from the market, but the ranks of labour were swelled by tens of thousands of discharged soldiers. 250,000 were demobilised by 1818. The farmers, who had planned ahead on a basis of war prices and had put all kinds of inferior land under cultivation, saw ruin staring them in the face. The Government found it easier to grasp the needs of agriculture than of industry. They passed the Corn Law of 1815, which prohibited importation so long as the price at home was under 80s. a quarter—*i.e.* double the price in the eighteenth century. This was a tax on the food of the people. It saved the farmer, but only at the cost of raising the price of bread for the weavers, spinners, and miners. Moreover it dealt a blow at manufacture. For if foreign countries could not import corn into England to pay for English manufactures, clearly they could not afford to buy them.[1] Therefore 1816 was 'a year of soup and reform agitation'.

The Committee appointed at the instance of the first Sir Robert Peel to investigate the conditions of labour in cotton mills was sitting, and most of his son's speeches in 1818 were concerned with the Bill that became the Factory Act of 1819. On 27th March the Warrington cotton spinners addressed him thus:

> 'Sir,—We, the cotton spinners and others employed for the cotton mills in Warrington, having observed with peculiar pleasure the very able manner in which you supported the Factory Bill on the second reading, take the liberty now to address a few lines to you, humbly presuming to hope that it will not be in vain for us to solicit your interference once more in our behalf.
>
> 'The principal cotton mills here work from half-past five in the morning till half-past eight at night, so that the poor children are called out of bed at five, and it is nine at night when they get

[1] This came out very clearly later under the stress of international competition, when, realising that export was only possible by import, the Manchester Chamber of Commerce, led by the master spinner and weaver, John Bright, and the calico-printer, Richard Cobden, piloted to victory the Anti-Corn Law Movement.

The Corn Laws.

By ALLEN DAVENPORT.
Author of all the Songs and Poems under the signature of Alphus.

Air.—"Auld Lang Syne."

Ye millions that so keenly feel
The pressure of the times,
To you I earnestly appeal,
Then listen to my rhymes,
In vain you labour night and day,
The owners of the soil,
By Corn Laws takes the bread away,
That should reward your toil.

CHORUS.

Then open every British port,
And let the poor be fed,
No longer see your children starve,
And die through want of bread.

The haughty possess the land,
And wield oppression's rod,
Inspite of that divine command,
Found in the word of God;
The Corn Laws petrify their hearts,
And make the nation groan,
For when the people cry for bread.
They only get a stone.
Then open every, &c.

Down, down, with the starvation laws
And no more be beguiled,
Cheap bread must surely be the cause
Of woman, man, and child;
All property is insecure,
And insecure muts be,
Till they our plundered rights restore
And make the Corn Trade free.
Then open every, &c.

The Corn Laws are the greatest scourge
That has been since the flood,
Enacted since the time of George,
Whose reign was that of blood!
But we have now a Queen beloved,
Oh! let it not be said,
That she can see and hear unmoved,
Her people cry for bread.
Then open every, &c.

home, some of them being under six, many under eight years of age. We feel exquisitely for these in the winter time, coming out of the warm bed, clothed in rags or half naked, through the cold, frost, snow, winds and rain, many of them barefoot, into the hot room, where no air is permitted to enter that can be prevented, as it is injurious to the spinning of cotton.

'Hoping your ardent zeal for our welfare will ultimately be crowned with success, we have the honour to be', &c.

On 19th April, acknowledging Peel's reply, in the desire to furnish him with fresh 'ammunition', they gave a graphic picture of the irregularity of employment prevailing:

'We understand Mr —— is intending to send a petition against the Bill, though his factory has not worked ten hours per day upon an average for the last three years, sometimes stopping two or three days in a week, sometimes a week or a fortnight at once, and at other times working eight hours per day, just as he finds a market for his goods. When the trade goes well he compels them to attend fourteen to fifteen hours per day. At present they work from five a.m. to half-past seven p.m., and his spinners are all women and children. He avails himself of the present distressed state of the poor and the scarcity of work, to get them to work for low wages. He has now twenty-seven persons, from six to twenty-one years of age, for twenty-seven shillings per week, that is one shilling each upon an average'.

In the year 1818 there were four strikes in the cotton trade. That of the jenny-spinners of Stockport was amicably settled. But there was no general union. Spinners and weavers still stood aloof from one another. The Manchester spinners' strike was partly political. The weavers' was purely for a 7s. rise of wages, which many of the masters would have given gladly 'provided they were not undersold by the others'. The prosecutions that followed these strikes led to more reform agitation and to Peterloo—an event that was not a 'massacre' as it has been called (at the most eleven persons, some of them special constables, were killed or died afterwards of injuries), but which marked a turning point in the tide of popular opinion. The riot

had the unfortunate effect of checkmating the efforts, being made at the very moment it occurred, of the master manufacturers of Burnley, Bury, Blackburn, and Preston, and of all the calico printers, and also of the flannel manufacturers of Rochdale, to secure a minimum wage.

In 1826 forty-eight firms, led by John Fielden, the great spinner of Todmorden, and possibly influenced by seeing for themselves that the Government by repealing two years earlier (1824) the Spitalfields Act had ruined the silk weavers, tried to secure a voluntary minimum wage. But again the weavers ruined everything by an ill-timed attack on power-looms, smashing, in several cases, the machines of the very firms that were engaged in trying to secure for them better conditions. The damage done was great, so was the looting of shops and general disorder. The punishments were mild, but the weavers had cut their own throats. Their plight for years to come was pitiable.

The age was not only not lacking in philanthropists, it was singularly rich in them. Clarkson and Wilberforce were fighting for the abolition of slavery; Elizabeth Fry and John Howard for prison reform; Dr. Percival of Manchester, Richard Oastler, Michael Sadler, and many more strove to improve the lot of the children. Many employers, like Robert Owen of New Lanark, John Fielden of Todmorden, John Wood of Bradford, and the Brights of Rochdale made their works more social settlements than factories, with their parks, schools, and clubs. But employer and employed alike had been made by bitter experience to realise that no general improvement could be brought about without legislation; and, therefore, both were intent upon political reforms that would get better representation for industry in Parliament. The crime of the State, if crime there was, was the toleration of the existing conditions of things. And the blame, if blame there be, must be laid chiefly at the door of Napoleon, whose unlimited ambition and megalomania involved not only England, but all Europe, in a war as devastating and six times as long as that in which, a century later, she was

involved by the megalomania of Germany. During this war England's economic and social development had outrun her political development. With the French ideals before them of 'liberty, fraternity, and equality' (fraternity and equality in which, however, the rights of private property were emphatically stressed and safeguarded), the industrial classes believed that their best hope lay, as Cobbett taught, in being better represented in Parliament.

In any picture of the Industrial Revolution it is customary to depict the employers and the employed as the antagonists; and the machine-breaking, strikes, and rioting in the years 1806 to 1846 lend colour to this view. But it is doubtful if it is not largely misleading. After the Corn Law of 1815 the cleavage is rather between the Agrarian interests on the one side, and the Industrial on the other. The former became the Conservatives, and the latter the Liberals. It was this cleavage that gave poignancy to Sir Robert Peel's career. The son of a manufacturer, he became leader of the Agrarian party. But his early life held him, and having a 'sincerity too great to harden into consistency' and a courage as high as his principles, he became a 'traitor' to his party and repealed the Corn Laws, a thing desired, though for different reasons, by employers and employed alike. It is true enough that the alliance between them was an uneasy one. But their interests were similar, and their interest dictated their politics. Both had petitioned Parliament over and over again to pass a Minimum Wage Bill. Together they had created the wealth that gave England the victory over Napoleon, and together, if back to back, they were to give her Free Trade.

Drab as the years preceding the Reform Bill of 1832 were, they were not barren of dramatic events. They saw Richard Martin, noted boxer and duellist, but in spite of this known everywhere as 'Humanity Dick', get through Parliament the first Act (1822) for fair treatment of animals. They saw the rise of Liberalism and the birth of the modern Labour movement; the repeal of the Navigation Act, of the Combination Laws, of the Corporation

and Test Acts. The word 'Socialism' was first employed in 1827, the year in which the Duke of York had to go without a military funeral, because, as the Duke of Wellington said, there were not enough troops in England to bury a Field Marshal. The rival term 'Liberal' had been heard a year or two earlier. 'The doctrine of the general strike, originated by William Benbow, was preached in the early 'thirties, and at the same moment James Morrison was throwing overboard the doctrines of Owen'.[1]

To the artisan and the agricultural labourer the Reform Bill was disappointing. It gave the vote to the small employers, the shop-keepers, and the farmers, but it did not give it to them. One of the first Acts of the reformed Parliament was the Poor Law Act of 1834. Although this was a financial success, reducing the poor rate by more than two millions, and removing the reproach of the pauper being better fed and clothed than the hard-working artisan, yet the sudden stoppage of outdoor relief to those able to work did not make it easier to buy food.[2] The Melbourne Ministry, which was in power from 1835 to 1841, had too small a majority in the House to do much in the way of legislation. Nor was that kindly cynic Lord Melbourne of the stuff of which reformers are made. His ministry is remembered for the Chartist riots and the romantic accession of the Princess Victoria at the age of eighteen, and the happy separation, after 123 years, of the Electorate of Hanover from the British Crown.

The period known as the Industrial Revolution was nearing its close; the accession of the great Queen, whose reign was to do so

[1] Beer, *A History of British Socialism*, vol. i.

[2] It should in justice be noted that the poor rate, as readers of Macaulay's *Essay on Southey's Colloquies* (1830) will remember, was decidedly lower in the manufacturing districts than in the agricultural. In the year ending March, 1825, the counties heading the list were Sussex, Bucks, Suffolk, Bedfordshire, Kent, and Norfolk, all with a rate above 15s. In the West Riding, on the other hand, it was only 5s., and in Lancashire 4s. Also the mortality in Lancashire was believed to be decreasing. Till the days of the census figures are to be distrusted, but about 1750 the mortality in Manchester was said to be one in twenty-eight. In 1830 it was one in forty-five.

much to mitigate its worst evils, came at its very lowest point. The Chartist riots had begun in the same year as Lord Melbourne's Ministry. They were political in shape, but social in character. They were really riots for ' a living wage.' These last years of the Industrial Revolution are known as the ' Hungry 'Forties '.

> ' I mind them times when lads marched down our street
> Wi' penny loaves on pikes all steeped i' blooid ;
> ' I's breead or blooid,' they cried. ' We've nowt to eat ;
> To Hell wi' all that tax t' people's fooid '.

That was the spirit, and though Sir Robert Peel, who became Prime Minister with a huge Tory majority when Lord Melbourne's Government went out, passed his Mines Act (1842), prohibiting the labour of women and children underground, and a Factory Act (1844) restricting the employment of children and appointing inspectors to look into matters of safety and sanitation, it was not enough.

> The rich preached rights and future days,
> And heard no angels scoffing.
> The poor died mute, with starving gaze
> On corn ships in the offing.

If England was not hysterical there was no doubt that she was hungry. Never since the Reform Bill had there been such meetings of the Cabinet, so frequent, so secret. It was proposed to abolish the duties on 430 out of 813 articles of raw material of manufacture, including the duty on the import of cotton-wool, which yielded a revenue more than double all the rest of the 430 put together, viz., £680,000. The movement for Free Trade was shaking Peel's faith in the Corn Laws. He had seen famine in Ireland in 1817, and now the terrible potato famine turned his mind to the danger of famine at home. He was a man of vision as well as a man of feeling. After much anxious thought he decided to cross the Rubicon and repeal the Corn Laws. On 16th May, 1846, he did so, mainly by the votes of his opponents, the Whigs. The repeal was passed by 337 votes to 240, and the

minority included two-thirds of the Conservative Party. 'I was not considering', said Peel in his final speech on the Bill, 'what was the best bargain to make for a party. I was considering first what were the best measures to avert a great calamity, and, as a secondary consideration, to relieve that interest which I was bound to protect from the odium of refusing to acquiesce in measures which I thought to be necessary for the purpose of averting that

THE GREAT CHARTIST GATHERING TO PRESENT THE MONSTER PETITION

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calamity. Sir, I cannot charge myself or my colleagues with having been unfaithful to the trust committed to us. . . . My earnest wish has been, during my tenure of power, to impress the people of this country with a belief that the legislature was animated by a sincere desire to frame its legislation upon the principles of equity and justice. I have a strong belief that the greatest object which we or any other government can contemplate should be to elevate the social condition of that class of the people with whom we are brought into no direct relation by the exercise of the elective franchise. I wish to convince them that our object has been so to apportion taxation, that we shall relieve industry and labour from any undue burden, and transfer it, so

far as is consistent with the public good, to those who are better enabled to bear it. I look to the present peace of this country; I look to the absence of all disturbance—to the non-existence of any commitment for a seditious offence; I look to the calm that prevails in the public mind; I look to the absence of all disaffection; I look to the increased and growing public confidence on account of the course you have taken in relieving trade from restrictions and industry from unjust burdens; and where there was dissatisfaction, I see contentment; where there was turbulence, I see there is peace; where there was disloyalty, I see there is loyalty; I see a disposition to confide in you, and not to agitate questions that are at the foundations of your institutions'. Peel proved true to his convictions: he had justified the Duke of Wellington's opinion of him—'I never knew a man in whose truth and justice I had more lively confidence'. But the price was heavy. He had hopelessly broken the Conservative Party, and doomed himself to sit in opposition for the remainder of his life.

The repeal of the Corn Laws made Chartism unnecessary; and thus, while the rest of Europe was plunged in revolutionary movements, and France, in the throes of widespread unemployment, was trying the experiment of Louis Blanc's national workshops, it quietly disappeared. It had caught a severe chill from the soaking rain of the day on which it presented its monster petition at Westminster. 'It died of publicity; of exposure to the air; of the Anti-Corn Law League; of the evident tendency of the time to settle all questions by reason, argument, and majorities; of growing education; of a strengthening sense of duty among all the more influential classes. . . . Chartism did not die of its own excesses; it became an anachronism; no one wanted it any more'.[1] Manchester had triumphed. In 1843 it had called its finest hall the 'Free Trade Hall'. Led by the great spinner, John Bright, and the great calico-printer, Richard Cobden, it could boast itself a city with a soul. It stood for an idea, which was to win as ready a response from Gladstone as from Peel. For

[1] Justin M'Carthy, *A History of Our Own Times*, vol. ii. pp. 17-18.

two generations Manchester was to direct the public policy of England.

The chariot of State is drawn by an ill-matched pair of steeds called *Political Progress* and *Economic Advance*. One of the most difficult problems of statesmanship is to make the more steady and docile *Political Progress* keep step with his unruly and wayward yoke-fellow. In the early days of the Industrial Revolution, the new political ideas that sprang up in America and were on the point of being introduced at home by Pitt, were strangled by the horrors of the French Revolution. The martial music of the Napoleonic Wars put *Economic Advance* on his mettle. He pawed the ground, while his eyes flashed and his nostrils quivered. *Political Progress*, on the other hand, shied at the roar of cannon, and never learned to step in time to trumpet and drum. And so *Economic Advance* took the bit between his teeth, and it was forty years before all England's statesmen could make him answer to the curb. They quite failed to do it until they had made *Political Progress* quicken his pace. In the ten years preceding the Reform Bill he began to do so, as we have seen, to some purpose; and he has moved so much faster since that he has now reversed the position. *Economic Advance*, who bolted in the early nineteenth century and forced *Political Progress* to lumber along behind as best he might, is, in the twentieth century, hard put to it to keep up with him.

VII

THE GEOGRAPHICAL SETTING OF THE COTTON INDUSTRY

§ 1

It has already been told how, in Arkwright's first specification for the spinning-frame which was to play such a great part in the

Fig. 1.—The Structure of the Cotton Province of South-East Lancashire. County boroughs are shown.

development of the cotton industry, the power was to be supplied by a horse. It was also recounted that Cartwright's first crude power-loom was worked by a bull. Crompton's mule, wonderful

machine though it has turned out to be, was at first worked by hand. It is obvious that relatively little progress could be made until some form of mechanical power was made to do the work. This was not long in coming.

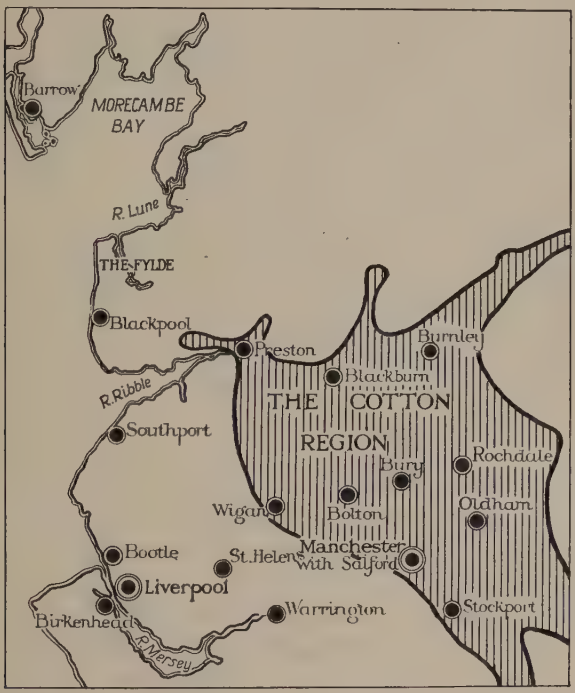


FIG. 2.—The Location of the Cotton Industry in the South-East Lancashire Province.

There are few cotton mills of any type in this region outside the area shaded by vertical lines. County boroughs are shown.

On pages 162 and 163 two maps of the Mid-Pennine region are given, the first one showing the surface features, the second one the location of the Lancashire Cotton Industry. On a third map these two are superimposed, and the boundary of the Lancashire Coal Field is also shown. Outside the border line of the Cotton

Industry as shown there are a very few and usually comparatively small mills. The total number of spindles west of the line indicated is about 290,000, of looms 8,400, and there is one firm of calico printers and dyers ; the whole of the spinning, weaving, and cognate work added together being no more than that of a very small town in the dense cotton region of East Lancashire.

There are evidently two inter-related factors which have determined or influenced the location of the cotton industry. In the first place it is seen that the industry clings to the hills, and yet it is now absent from the hills north of the Ribble Valley, which would appear at first sight to be a suitable locality. In the second place it does not leave the coal field very far, but it is not by any means co-extensive with the coal area, for in the considerable district west and south-west of a line drawn from Wigan through Leigh to Stockport there is plenty of coal, but there are very few cotton mills of any kind. The cotton industry clearly prefers to be near the hills and not far from the coal, and a conclusion which would seem to be obvious from an elementary study of the industry itself is thus borne out by a study of its actual location.

The reader will remember that Arkwright built an early mill at Cromford, in Derbyshire, where there was a reliable warm water spring, the water from which ran down the hill side. It was the water-power thus used that gave to Arkwright's spinning-frame the name 'water-frame', by which it was long known ; and the yarn produced by it was for a long time and is even yet occasionally known as 'water-twist'. Following his success, from about 1775 onwards, there sprang up in the Mid-Pennines and on the Rossendale Fells a great number of small mills driven by water-power.

The Rossendale Fells and the Pennines south of the Craven Gap are peculiarly well circumstanced for such a development. They keep back the dry east winds, while subjecting the west to downpours of rain. The rainfall almost everywhere is more than forty inches and often fifty inches, and it comes at every season. From reliable records it has been proved over and over

again that no successive three months of the year receive on an average less than ten inches or more than 15 inches of rain—that is, less than about 20 per cent. or more than 30 per cent. of the annual total. On the heights the degree of moisture of the air

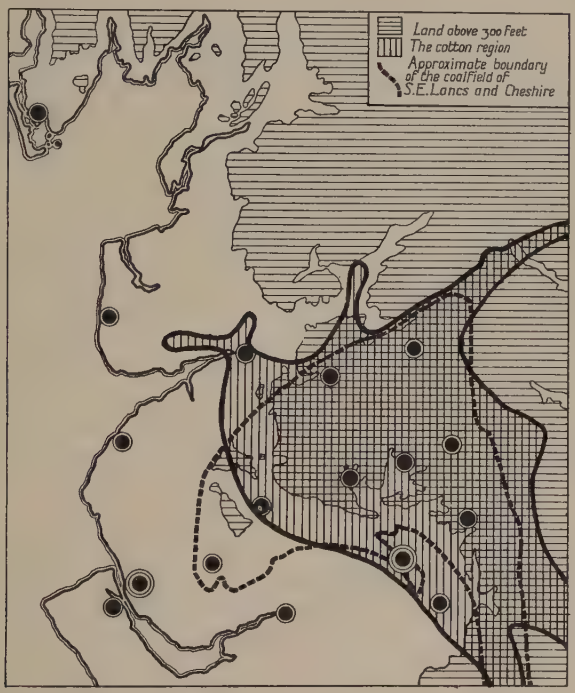


Fig. 3.—The Cotton Region showing the relations to the uplands by super-imposing the two preceding maps.

is often only 10 per cent. below complete saturation. The geological structure is also very important. The broad moors of the region consist very largely of coarse-grained sandstones belonging either to the Millstone Grit or the Lower Coal Measures formations. These coarse-grained sandstones are quite porous, as anyone can see by chipping a small depression in the broad face of a

piece of such sandstone (Fig. 4) and pouring water into the small basin thus formed. The water very quickly soaks into the piece of rock, showing that it is remarkably porous.

The coarse, porous sandstones generally lie in very thick beds, which are underlain by impervious or non-porous shales. The rain water which falls on the moors therefore soaks down through the sandstones until it reaches a bed of shale ; it cannot pass through the shale (except where there are cracks or faults), so that it flows along the bedding planes, to appear as a spring or a series of springs on some hillside not far away. What happens will be quite readily understood by reference to Fig. 5 with the explanation there appended. Anyone may imitate nature's process by taking a piece of shale or slate rock, clamping it below the piece of porous sandstone already referred to by means of two rubber bands, and then repeating the simple experiment mentioned. Water will be seen coming out at the junction of the porous sandstone and the impervious shale, as would of course be expected.

The hill slopes of the part of the Pennines under consideration and of the similarly built Rossendale Fells are seldom precipitous, but usually form the sides of broad V-shaped valleys. On these gentle slopes springs such as have been mentioned come out literally by the thousand and give rise to the small moorland streams which were of such great value in the early development of the cotton industry. Almost every little feeder of the Lancashire Calder, the Irwell, and the Tame had quite a number of little mills which were built at various times between 1775 and 1825. We may take as an example a part of the Lancashire Calder system, Colne Water and Pendle Water and their small tributaries, where one of the writers has been able to trace the sites of these small mills from old maps, various printed and written records, and from accounts by old inhabitants of the district. Many of the mill dams and goyts still remain or their former locations can be seen, but in a few instances more modern building operations have obliterated all traces.

The mill dams, or storage ponds, were usually necessary, but

were not considered to be so in all cases ; for example, the very small bobbin mill in Smithy Clough above Wycoller, almost all traces of which have now disappeared, had no such provision.

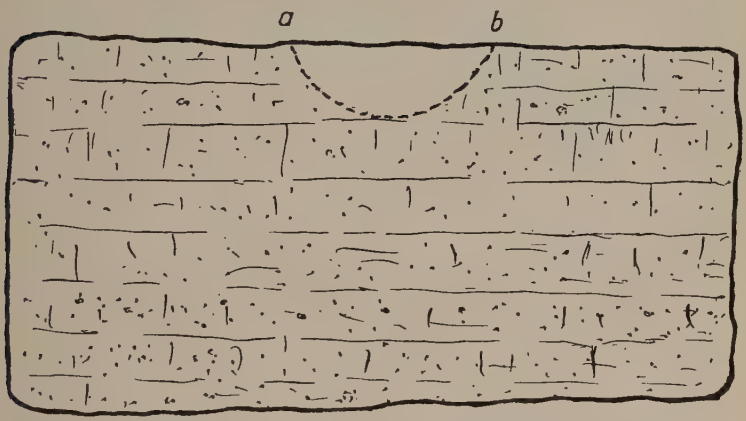


FIG. 4.—Diagram of a piece of roughly trimmed *Millstone Grit* or of *Coal Measures Sandstone*. Natural size. Face view. A shallow basin is chiselled in the top surface, shown in dotted profile *a* ..... *b*.

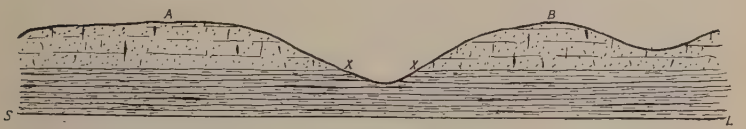


FIG. 5.—Diagrammatic section across a moorland region in the Western Pennines or the Rossendale Fells. Massive, porous, and well-jointed sandstones or grits overlie finely bedded, laminated, and impervious shales. Rain falling on the broad moors *A*, *B*, will soak down through the porous sandstone or grit, and springs are likely to occur on the sides of the V-shaped valley at *XX*. The figure is purely diagrammatic, and may be taken to represent a distance of about 10 miles across country, and the moors may be from 800 feet to 1000 feet, or even more above the sea-level, which is represented by the line *SL*.

The mill dam or pond had an artificial channel, or goyt, leading to the mill wheel sluice ; this arrangement enabled water to be stored in times of drought and controlled in times of flood, a consideration probably of some importance in most places.

It will be seen from this account how the Domestic System in the East Lancashire district was replaced by a Water Mill Era, during which the growing cotton industry became much more localised in the river valleys than it had been hitherto, and yet remained more widespread than it became in the next century. There were some of these small mills in districts which now seem quite remote from the densely-peopled industrial regions of to-day, and some of them maintained themselves until about the seventies or early eighties of the nineteenth century. Rimington, Gisburn, Hellifield, and Long Preston in Middle Ribblesdale; Broughton-in-Craven, Bell Busk, and Airton in Upper Airedale; Hubberholme and Arncliffe in Upper Wharfedale, seem far removed from the din of modern factory life, but there were small mills at all these places during some part of the period between 1775 and about 1850. Many other examples could be given from other districts.

A hat-making industry at Slaidburn in Bolland, Long Preston famous for the weaving of calicoes, calico printing at Sawley in Ribblesdale, cotton weaving at Arncliffe in Littondale, worsted weaving in Upper Dentdale—these seem almost incredible to-day; they were facts about a century ago. Dr. Whitaker, the historian of Whalley and of Craven, writing at the beginning of the nineteenth century, deplored the 'ruin' which seemed to be coming over his beloved Craven and Ribblesdale by the spread of cotton and woollen mills. He need not have been so seriously alarmed; the little mills in those rural districts proved but a passing phase.

We have recorded already that Arkwright introduced Boulton and Watt's steam engine into a mill at Nottingham in 1790. Arkwright was not the first by any means, for Boulton had written to Watt so early as 1781 'The people in Manchester are all steam-mill mad'.[1] From this time onward steam was increasingly applied, first to spinning and then to weaving, as Cartwright's loom came to be more widely used. The Lancashire people had a big strain of conservatism mixed with their keenness, however,

[1] See p. 138.

and it seems to have been 1819 or 1820 before the 'steam-loom' had become fully established in the more remote parts of the cotton province. Even so late as 1840 there were still many hand-loom weavers on the more remote hillsides, and an aunt of one of the writers took her woven pieces to Colne Piece Hall (the 'Cloth Hall' as it was more commonly called) as late as 1840. There was thus considerable overlap, as might be expected, of

FIG. 6.—A diagram map showing the position of the old mills which were run by water, mostly erected between 1780 and 1830, on the small rivers of a part of north-east Lancashire. The map covers a distance from West to East of about 10 miles. In that area there were at one time or another no less than 25 of these small mills. In some cases modern mills occupy the position of the earlier mills. Some have totally disappeared, leaving very few traces. The approximate position of the mills is shown by ✲.

the three phases—the Domestic, the Water Power, and the Steam Power periods.

With the full conquest by steam power, the industry gradually left the more remote valleys, where roads were certainly still poor and transport rather difficult, and concentrated itself more and more on or quite near the coal field. Water was still necessary, of course, no longer as power, but for use in the condensers of the steam engines and in the numerous washing operations of the

industry. Hence mills began to appear in considerable numbers adjacent to the canals as well as on the banks of the small rivers. Taking as examples four cotton weaving towns of quite different type—Blackburn, Burnley, Nelson, and Barnoldswick—one has only to walk on the towing-path of the Leeds and Liverpool Canal through those towns to see the important part played by that canal in determining the location of many cotton mills. Many a big cotton mill in East Lancashire stands on ground between a canal and a railway ; and many a mill has its own coal tip either on the canal or on the railway, and as near as possible to its great steam boilers.

Not only has the motive power, and thus the coal field, had much to do with the present distribution of the industry and its location to such a large extent in South-East Lancashire, but other factors have contributed. Mention has been made of the rainfall and how this means an abundant and regular supply of water in the streams. A distinctive character of the region is its cloudiness and the moist character of its atmosphere. This is popularly quoted as the *one* great factor in the location of the cotton industry. Americans reckon the advantage which Lancashire possesses on account of its climate at 7 per cent. of the cost of production on all fine counts. There is little doubt that fine yarns, such as are now spun and woven to so large an extent in Lancashire, could not be successfully worked in other than a moist atmosphere, and Lancashire is certainly indebted to some extent to its ' atmosphere ' for its pre-eminence, but this factor is by no means the only one, and it is doubtful if it should be reckoned the chief one.

We have seen the important part played by the hundreds of small rivers with their almost unfailing flow ; these are clearly dependent upon geological structure as well as upon the rainy climate. Further, the presence of building stone in such quantities close at hand and easily obtained must be counted as of considerable importance ; the fine, stone-built factories and the immense numbers of stone-built houses of the artisans continually remind us of the importance of this factor. We may also

remember that, where stone is not so plentiful and not so near at hand, there are the shales of the coal measures, and these can easily be ground up and made into some of the best bricks in the country. Such factors should not be overlooked. The growth, the development, the continued success of a great and complex industry—these do not depend upon any one factor; many interrelated and interacting causes must clearly be taken into account, and it is neither easy to commit ourselves to a decision as to which is the most important, nor is it necessary that we should attempt to do so. For the sake of convenient reference we summarise them here without either attempting to decide which should take first rank or even asserting that these are the only factors.

(1) The structure of the hilly region and the presence there of great numbers of small moorland streams.

(2) The fairly regular and heavy rainfall and the moist atmosphere.

(3) The comparatively even temperature experienced; that is, the winters are not too cold, the summers not too hot and dry.

(4) The presence of a rich coal field.

(5) Abundant supplies of good building stone and shale for brick-making.

(6) The nearness to a great and a prosperous port on a sea which is never closed by ice even in the severest winter.

(7) The development in the early days of a very fine system of canals, in later days of roads, and later still of railways.

(8) The making of the Manchester Ship Canal, and Manchester becoming a great port.

To these may be added two more factors, not strictly geographical:

(9) Historical reasons, such as the coming of the Flemings, the Huguenots, and others, bringing with them knowledge which would have reached Lancashire much later.

(10) The thrifty habits and the determined character of the people of the cotton region.

§ 2

A vigorous industry such as that of cotton does not allow itself to be circumscribed by any Local Government boundaries. We have seen already how it has passed over the Lancashire border into Cheshire, Derbyshire, and the West Riding of Yorkshire. In some cases the industry in these ' outliers ' is as old as it is in Lancashire itself.

Within the last half century or so there has been a more vigorous overflow along canals, railways, and main roads, and we now find strong colonies which have clearly some relation to that part of Lancashire from which they would appear to be offshoots. The principles are brought out clearly by looking at the matter as it relates to the counties immediately in contact with South East Lancashire. Take Cheshire first of all; there are four boroughs which lie astride or close to the county boundary—Mossley, Dukinfield, Hyde, and Stockport, whilst Stalybridge and several large villages are but a short distance away. Here we find cotton spinning and doubling, some weaving—chiefly of domestic cloths and other specialities—and a big development of bleaching, dyeing, finishing, and printing, for which the abundant water of the hills in that district is suitable. This principle holds not only for Cheshire but also for those parts of Derbyshire and Yorkshire which are close to that corner of South East Lancashire. At Glossop, Dinting, Strines, New Mills, Hayfield, and Chinley we find North West Derbyshire engaging in exactly the same branches of the great industry; but Saddleworth, Greenfield, Delph, Diggle, and Dobcross in the West Riding are really part of the Oldham province and share in its phases of the cotton industry.

Now let us look somewhat farther afield in the West Riding of Yorkshire. In the narrow valley of the Yorkshire Calder from Todmorden, extending as far east as Dewsbury, we find numerous isolated cotton mills and colonies of mills. Spinning and doubling of the finer grades of cotton, as well as dyeing, bleaching, and

finishing, remind us that the cotton industry here may be regarded as an overflow along the Rochdale Canal and the old main line of the Lancashire and Yorkshire Railway, from the Rochdale province in East Lancashire. The same phases of the industry are found away up the tributary valleys of the Yorkshire Calder, such as the Ryburn, Hebble, and Colne. The more important centres of the cotton industry here are the county boroughs, Halifax and Huddersfield, with a number of mills at Elland, Brighouse and Mirfield, among the smaller towns, and occasional mills in a score of the typical West Riding villages among the moors. In this Calder region the cotton industry and the there greater woollen industry are much intermingled. In any given valley one small town may be given over entirely to wool, whilst in the next town or village we may find a number of cotton mills.

If we go farther north in the West Riding, we come to the Craven Gap, leading from East Lancashire to the river Aire and its tributaries ; here we find the cotton trade established beyond the county boundary at the villages and towns of Cowling, Earby, Kelbrook, Salterforth, Barnoldswick, Skipton, Gargrave, Carleton, Cononley, Bradley, Embsay, Silsden, and Keighley. The Barnoldswick-Earby group, with perhaps one slight exception, is given over entirely to cotton weaving of the 'sorts' made in Colne, Nelson, and Burnley. The other places mentioned are weaving and not spinning towns. The spinning mills at Gargrave and Carleton are only slight exceptions to the general rule. The cotton industry has rather more distant 'outliers' at Linton in Wharfedale, at Settle in Upper Ribblesdale, and an occasional mill in the Bradford district.

Now glance at Cheshire again. Much further afield from Manchester are the cotton mills in the region which includes Macclesfield, Bollington, Congleton, together with a few in North Staffordshire. Here again we find spinning and doubling of yarn, dyeing and bleaching, and especially work on mercerised cotton, as we should expect in this region which is chiefly devoted to silk. In Central Derbyshire there is a most interesting sprinkling

of scattered mills, one here and there. Chapel en le Frith, Tideswell, Millers Dale, Matlock, Ashbourne, and Wirksworth read more like holiday towns and villages, but we find an occasional mill carrying on spinning, or weaving, or bleaching and dyeing some kind of cotton goods. At Derby itself and in the immediate district there is a specialised sewing cotton thread manufacture and some development of the hosiery manufacture, in which a good deal of cotton is now used.

South East and East Derbyshire—Long Eaton, Heanor, Ilkeston, and even as far north as Chesterfield—fall within the Nottingham influence, and here we find lace and hosiery, in which plain cotton and mercerised cotton are used in conjunction with linen, silk and artificial silk. The city of Nottingham is the centre of the lace and lace curtain industry, a manufacture which extends into many of the other towns in the county, such as Sutton-in-Ashfield, Mansfield, and Southwell, and, as we have already seen, into the adjoining parts of Derbyshire. In the same districts we find a number of mills engaged in spinning and doubling fine counts of cotton for use in the lace, hosiery, and glove industries.

The manufacture of hosiery and woven and knitted gloves is now a considerable industry scattered over South Nottingham, Leicestershire, and the adjoining parts of Warwickshire and Staffordshire. Leicester is the great centre of the industry. In the same region is found the manufacture of elastic webs, tapes, and similar fabrics. In this group of industries, cotton, mercerised cotton, wool, linen, silk, and artificial silk are used.

There is a miniature province in Scotland similar to that in Lancashire, and there all phases of the cotton industry are carried on, with Glasgow as a centre. The spinners and doublers are located in Glasgow, and in the counties of Renfrew, Perth and Lanark, where stood the New Lanark Mills, which Robert Owen, by his reforms and the visitors he attracted, made so famous that, by their example, they may be said to have helped to bring about the improvement in factory conditions,

education and housing which we see to-day.[1] The bleachers, dyers, and printers are in the same region and in North Ayrshire ; and the manufacturers, as the weavers are called in the trade, are located in the same somewhat wider region. The Scottish weavers go in for mixed goods very considerably, and many of them advertise themselves as ' Cotton and Woollen Manufacturers.' In this Scottish province stands Paisley, the home of the manufacture of sewing thread, which has to be much stronger than the fine thread used in weaving. Thomas Coats and George Aitken Clark were two of the original founders of this great business, which now supplies most of the world with sewing thread and employs ten thousand workers. Once the thread used to be sold in hanks. Then Clark got a turner to turn wooden reels upon which it was wound, and for which customers were charged an extra half-penny, which was refunded if the reel was brought back. Now at the Paisley works may be seen huge stacks of timber, which are converted by machinery into non-returnable reels. At the cotton-spinning factory of Monteith and Company at Blantyre, in Lanarkshire, worked for a time the most famous cotton-spinner Scotland ever produced. In 1823 David Livingstone, aged ten, began work there as a piecer, later becoming a spinner. The hours at that time were from six o'clock in the morning till eight o'clock at night, but during them Livingstone managed to carry on his reading by propping up his book on his spinning-jenny and devouring it a sentence at a time as he passed backwards and forwards over his work. The mill is proud of him, though as a spinner he failed to distinguish himself, and when he left ' was no thocht to be a by-ordinar' laddie.' [2]

It remains to be added that there is some cotton spinning in North-Eastern Ireland, where the industry is connected with the spinning of flax. The fibres of cotton and flax are often combined in various forms of thread for sewing, knitting, and weaving.

[1] Cf. *The Life of Robert Owen*, by Himself.

[2] Sir H. H. Johnstone's *Livingstone*, p. 56.

§ 3

No sooner had the cotton industry definitely established itself around its main centre in South-East Lancashire than specialisation led to further localisation within the industry itself.

Richard Arkwright erected his spinning mill at Cromford in 1771, and he also wove calicoes, 'all cotton', in 1774; at a later date he had a spinning and weaving mill at Nottingham; he carried on the two chief operations of the cotton manufacture. So also it was with pioneers such as the famous John Horrocks of Edgeworth. He set up a few spinning frames in his father's stonemason works at Edgeworth, and very soon afterwards he erected his own factory at Preston—the noted 'Yellow Factory'—and carried on both spinning and weaving. It was the same with most of the pioneers; they engaged in the two processes, and frequently carried them on under the same roof.

As the industry expanded during the nineteenth century, spinning and weaving gradually tended to separate, and many great and successful firms confined themselves to one or other of the great groups—scutching, carding, combing, drawing, roving, spinning in one set of factories; winding, beaming, sizing, weaving in another set. This tendency continued until there had grown up, long before the end of the nineteenth century, a very well marked geographical localisation of these great groups. Some of the old firms, which date from the earliest days of power-looms, have always carried on both processes, but even they have often found it advantageous to separate the processes, and their spinning is done in one place and their weaving in another. This is the case with some of the great Manchester firms who can proudly claim a history of well over a hundred years.

The spinning industry is now mainly carried on in the suburbs of Manchester and in the crescentic curve of towns within a little more than a dozen miles of that city, from Stockport, slightly south-east of Manchester, round by Ashton, Oldham, Rochdale, Heywood, Bolton, Wigan, to Leigh. Here are located some 80 per cent. of the ring spindles, mule spindles, and doubling spindles

of that great industry. Farther afield, there is, of course, some spinning carried on—at Todmorden, Huddersfield, Halifax, Bacup, Burnley, Accrington, Blackburn, and Preston—even so far away as Clitheroe and Colne, but the number of spindles in all these more distant towns is probably not more than about 18 per cent. of the whole in the Manchester province. It is obvious that the cost of transport must have been a factor helping to concentrate this branch of the industry near Manchester; though the moist atmosphere and the abundant water supply have undoubtedly had their influence.

On the map, Figure 7, the distribution of the various phases of the cotton industry is shown quantitatively, and from this map the reader will have no difficulty in realising to what an extent spinning has localised itself within this inner ring of the cotton towns.

Even within the spinning branch itself there is some well marked specialisation. If we consult a textile gazetteer showing the particular class of yarns in which each firm specialises, we shall be struck by the preponderance of firms in greater Oldham who spin Medium American—20's up to about 60's counts; but if we look up the Bolton spinners we see that a great many of them handle the finest American and Egyptian, and that counts of 80's and upwards are quite common. Further, if we turn up Stockport district, we see many firms advertising themselves as 'doublers and gassers'—a far larger proportion than in any other part of the spinning region. Thus there is distinct specialisation even within the spinning branch of the cotton industry.

The cotton weaving zone is localised north of the Rossendale Fells, and in the valleys of the Lower Ribble, the Darwen, the Lancashire Calder and its tributaries. Here is a belt of towns which includes Preston, Chorley, Blackburn, Accrington, Burnley, Nelson, and Colne. There is some spinning in these towns, but the weaving far outweighs it in volume. More than 75 per cent. of the looms in the Manchester province are included in the district mentioned. This localisation of the weaving may be clearly

seen by a study of the map, Figure 7, to which we have already referred in our study of the spinning branch.

Again, there is specialisation within the weaving belt, similar to that which we found in the spinning zone; Preston has many jacquard looms and also makes flannelettes, longcloths, and other fine goods; Blackburn and district weaves large quantities of dhooties for the India and China trade; Accrington produces mulls and jaconettes—light cheap cottons for the India market; Burnley has long been famous for Burnley Printers, which are often spoken of as 'Burnley Lumps' when woven and ready for delivery to the calico printer; Nelson makes large quantities of sateens, gaberdines and poplins, while Colne specialises in shirtings, blouse materials, and other fancy goods. The specialisation is by no means exclusive or complete, but it is well marked, as may again be seen by looking through a textile gazetteer of the weaving region, and noting what classes of goods are turned out by the different firms.

Some statistics may not be out of place here in connection with these major operations of the cotton industry. The whole province, within about forty miles of Manchester, had already sixty million spindles in 1923; of these over seventeen millions were in greater Oldham; Bolton comes next, though considerably behind, but it must be borne in mind that finer counts are spun in Bolton, and thus the yarns turned out are of higher relative value than those from the Oldham region. Blackburn may claim first place in the weaving zone, as it has more looms than any other town in the world. If we take Blackburn in the limited sense as including Blackburn, Livesey, and Mellor, we find a grand total of 89,827 looms; Burnley with Lowerhouse has 87,422 looms. If we take 'Greater Blackburn' and add Whalley, Rishton and Great Harwood to those mentioned above, the total becomes 116,740 looms; if to Burnley as defined above we add Hapton, Clow Bridge, Worsthorne, and Briercliffe, we find a total of 101,120 looms.[1] Burnley claims, however, and no doubt

[1] The Directories published by John Worrall, Ltd., Oldham, are invaluable as sources of statistics for the Textile Industries.

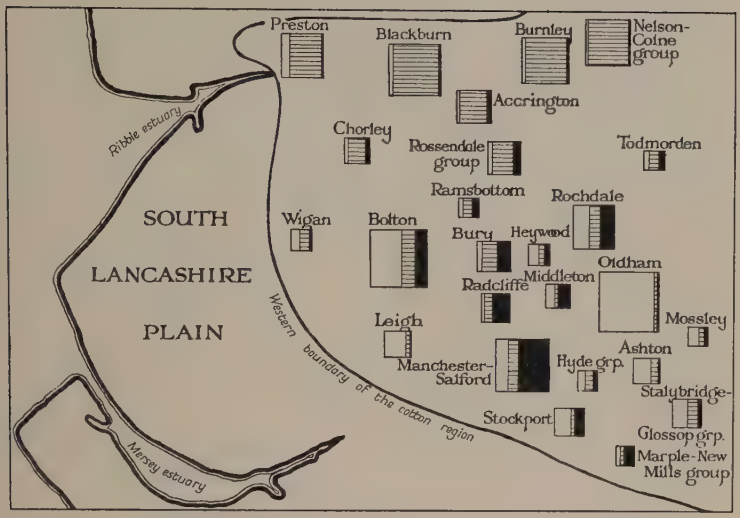


FIG. 7.—Diagram map of the Distribution of the Cotton Industry in the Manchester Province. The three chief phases of the Industry are shown quantitatively:

(*a*) The Spinning and Preparatory, shown white, in the squares.
(*b*) The weaving is shown by shading in the squares.
(*c*) The bleaching, dyeing, printing and finishing, shown by black in the squares.

The sizes of the squares and the proportion of each phase are made proportional to the number of *spindles*, the number of *looms*, and the number of *separate works* engaged in the chemical and finishing group. The unit for spinning is 100,000 spindles, the unit for weaving is 1000 looms. The unit for bleaching, dyeing, etc., is one separate mill or works. Thus the Nelson-Colne group of towns in the north-east has approximately 320 000 spindles, 99,000 looms, and 7 dye or bleach works. Greater Oldham has approximately 17,400,000 spindles, 120,000 looms, *and* 7 works engaged in "Cotton Chemistry."

SEE THE TEXT; and also compare with figures 1, 2, 3.

with justice, that it turns out more yards of cotton cloth than any other town in the world ; it should be mentioned here that a great number of the Burnley looms are weaving cloth not more than 30 inches wide, that they ' pick ' very rapidly, and in consequence they turn out an immense length of cloth. It is very significant, however, to learn that Burnley is gradually turning to more complex and expensive weaves, and the Burnley weaving industry is thus following the general tendency of the whole cotton trade of Manchester and district.

If one watches a carding machine at work for a time, there is seen coming out from it not only the sliver of carded cotton which is to go to the comber or to the drawing frame, but also a subsidiary lap of ' waste ', consisting of shorter fibres which have been rejected by the machine. This ' waste ' is, of course, not thrown away. At every stage, from the opening of the bale to the finishing of the woven piece, there is some rejected material which comes under the general term ' waste ', but waste in the strict sense cannot be allowed. All the rejected material is carefully gathered up and used in special processes. Every cotton town has its ' waste dealers ', who either work it up themselves or sell it to those firms who make a speciality of waste spinning or other processes with waste.

This reclaimed material is the basis of a considerable industry, and there is specially constructed spinning machinery for making it into yarn of coarse counts, such as 5's to 10's. These machines will deal not only with the cotton waste but with very short stapled Indian or Chinese cotton, or with short fibres of wool. Wool waste is frequently mixed with cotton waste in some of the reclamation processes. Cotton waste is bought up on the Continent, and in India, China, and Japan ; it is imported into Lancashire, worked up into various commodities and sold here or re-exported to all parts of the world. Among the goods which are made from waste are sheetings, towels, flannelettes, blankets, floor-cloths, carpets, dusters, cleaning cloths, mops, lamp wicks, cotton wadding, surgical lint, flocks, and, by chemical treatment, paper, cellulose fibres or artificial silk and gun-cotton.

The spinning and weaving of cotton waste and the manufacture of the various products from waste are chiefly located in a wide belt running athwart the whole industry from Manchester and Bolton to Burnley. The home of sheeting weaving is in the towns of the Rossendale Fells, particularly Haslingden, but there are outliers of this group of waste industries in many other cotton towns. Rochdale district and round Manchester are the homes of various waste specialities in which foreign waste plays a great part.

Textile Chemistry Industries. The great group of operations in which chemistry plays the important part has been mentioned many times ; in this group we may include bleaching, mercerising, dyeing, printing, sizing, and perhaps it may not be amiss to include the calendering, schreinering and other processes here, because the various mechanical effects are often produced with the aid of different chemical preparations which have been applied beforehand ; the whole group may for convenience be named the Textile Chemistry Industries. This group, too, has its own peculiar location. It tends to distribute itself in the middle of the cotton province and not far from Manchester—the great repository of the finished goods. Again it will be noticed that the textile chemistry works are almost always found where a good supply of water is available ; that is generally the first and most important consideration, hence the works of this kind are seen to be clustered near the moorland streams which come down from the Western Pennines, the Rossendale Fells, and the Pendle range of hills. Large supplies of fairly pure, soft water are required for bleaching, mercerising, dyeing, and printing ; hence the banks of the rivers Goyt, Mersey, Tame, Medlock, Irk, Roche, Bradshaw Brook, Irwell, and Hyndburn are well lined with works belonging to that group. The reader may be reminded again of the importance of the geological structure of the hills, and of the comparatively heavy rainfall ; the cotton industry owes much to these two factors.

Now that we have considered the localisation of the different branches of the great cotton industry, it remains to glance at the

buying and selling, or marketing. Liverpool is still by far the greatest raw cotton market in the world, and Lancashire spinners buy the larger part of their raw cotton through brokers at that market. Almost all the American cotton used in Britain is still sold at Liverpool, but Manchester has managed to secure a considerable share of the Egyptian cotton. The finished goods are sold at Manchester, very largely on the 'boards' of the Royal Exchange. Great numbers of spinners and manufacturers,[1] yarn agents and cloth agents attend Manchester every week-day. Tuesdays and Fridays are the special market days; on these days probably at least 12,000 men come to Manchester to buy and sell something connected with cotton. At High 'Change', at about 2.30 p.m. on each Tuesday and Friday, there are from 8,000 to 10,000 men on the floor at one time.

Let us now trace the history of an imaginary bale of cotton from the beginning to the end of its adventures. From the dock warehouses at Liverpool or Manchester the cotton goes to the spinners who, as we have seen, have their mills mostly in the curve of towns round and not far from Manchester. When the cotton has been spun into yarn it may follow one of two courses; the first is direct to the weaver (the 'manufacturer') who may have his factory thirty or more miles away from the spinner; or it may go to one of the textile chemistry works to be bleached or mercerised or dyed. Sometimes the prepared yarn goes to the warehouse of a yarn dealer in Manchester or district, there to await purchase or delivery to the weaving mill.

When the yarn has been woven the cloth is still, as we have seen, in an unfinished state, and rarely ready for direct sale to the public. It goes now to one of the textile chemistry works or finishers, from where it is finally sent to the Manchester warehouse, where it is packed in suitable form for the export trade or for the great wholesale 'Houses' of the home trade. The home trade is, of course, of vast importance to the cotton spinner, weaver, textile chemist and finisher; it probably means the sale

[1] Those Mill Owners who weave the yarn are usually called 'Manufacturers' in Lancashire.

and purchase of cotton goods the *wholesale value* of which is nearly £50,000,000 per annum—that is, slightly more than £1's worth per annum for every person in the British Isles. But the cotton industry is never allowed to forget that it makes high-class cotton goods for the whole world, and that nearly 80 per cent. of the output has to be sold outside the homeland. Buying the *whole* of its *raw* cotton, selling four-fifths of its *finished* cotton overseas, the greatest of all our manufacturing industries is peculiarly dependent upon world trade.

VIII

THE COTTON MILL

THE Cotton Industry is the greatest manufacturing industry not only in Britain but in the whole world, and its importance is not confined to Lancashire, but concerns the whole of the British Isles and the British Empire. It has been estimated that ten millions of people in this country depend either directly or indirectly upon the cotton industry for their daily bread. The great importance of the industry may be illustrated by comparing the value of the exports of cotton manufactures with that of other great manufactures and with the whole export trade of Great Britain and Ireland. In 1924 the total value of our exports (excluding articles which were imported simply to be re-exported) was £801,000,000 in round figures ; the value of cotton piece goods exported was £153,500,000 ; that of cotton yarn £28,800,000 ; if we add £2,500,000 for cotton lace and £7,000,000

for cotton thread, we arrive at a grand total of nearly £192,000,000, or 24 per cent. of the total exports of the British Isles. In calling attention to these vast figures we must also point out that the cotton trade of the British Isles was still, in 1924, passing through the worst period of depression since the time of the American Civil War in the sixties of the last century, and that millions of spindles and thousands of looms were partly or wholly idle during that year. In spite of this depression our total exports of manufactured cotton goods were almost as great in value as those of woollen and worsted manufactures, iron and steel manufactures, and machinery, all added together.

The exports are probably between 75 and 80 per cent. of the whole of the manufactures, so that the total value of the output of the cotton mills of Great Britain and Ireland amounted approximately in that year to the vast figure of from £240,000,000 to £250,000,000.

The main operations in this vast industry have already been indicated in the chapter dealing with the early inventions ; there must always remain the two fundamental processes of *spinning* and *weaving* ; all others are additions and expansions. As the industry has become more complex, and as its scale has increased, more and more specialisation has come in [1] ; but, on the whole, the sequence must be the same. We shall now describe the processes and operations of this great industry in language as non-technical as possible.

The raw cotton arrives at Liverpool or Manchester compressed into bales—in the case of American of 480-500 lbs. each, Egyptian of about 750 lbs., Indian of about 400 lbs. The cotton in the bale is in a matted state, the fluffy fibres crossed and entangled in all directions ; further, there is inevitably a good deal of ' dust ', hard twigs, bits of leaves, and other impurities ; the ultimate task is to sort out the fibres, each of which has a diameter of not more than about a two-thousandth part of an inch, to arrange them in parallel order and then to spin them into a continuous firm thread, and, finally, to weave into cloth and ' finish ' it. The

[1] Cf. Chap. VII. (iii).

first process is that of breaking up the bale and *cleaning* the cotton.

The bale is broken up by a bale-breaking machine, and cotton from different sources is then mixed together according to the experience and requirements of the spinner. From the bale-

A PUBLIC COTTON WAREHOUSE IN AMERICA
Bales waiting transportation
Photograph by Ewing Galloway, N.Y.

breaker the cotton passes into another machine called an 'opener', then into one called a 'scutcher,' and finally, so far as this preliminary stage is concerned, into one called a 'finisher-scutcher'. The essential aim of these machines is to break up the matted cotton fibres, get rid of seeds, sand, and other 'impurities', and to reduce the cotton to a broad, white sheet of cotton-wool of fairly even thickness. At the end of the process the cotton issues slowly from between rollers, and the fleece is

wound into a broad roll or ' lap ', as it is called. The great thing here is regularity, and all laps from the finisher-scutcher are carefully weighed.

The next process is that called ' carding ' ; this is the old hand process carried out by a wonderfully perfect machine called a ' carding engine '. The essential parts of this machine are rollers which pass the fleece of lap against a large cylinder covered with fine metal teeth—each tooth about quarter of an inch long and about 600 to the square inch. From this large cylinder the lap

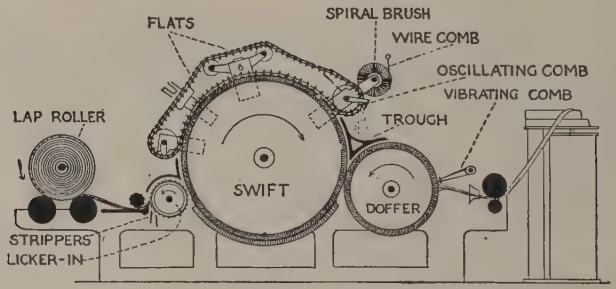
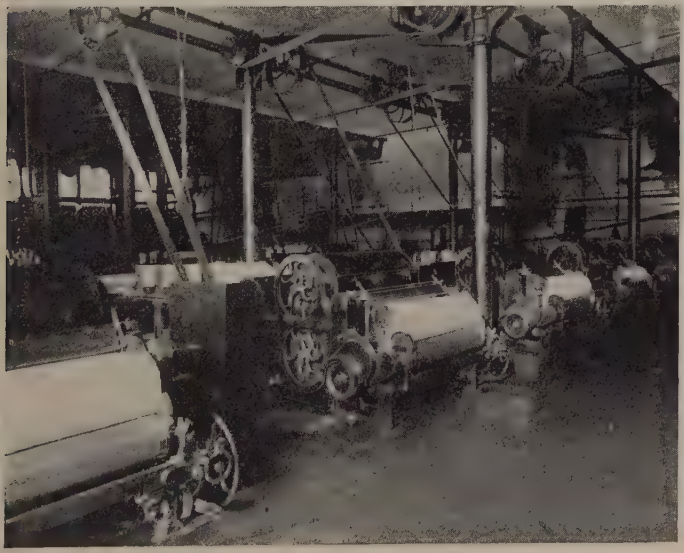


Fig. 8. SECTION OF A CARDING ENGINE

passes on to a smaller cylinder, also furnished with teeth, and finally to an oscillating comb which combs off the cotton as a semi-transparent veil of white cotton, not more than about one-hundredth of an inch thick. In this the fibres are now set lengthwise, fairly parallel to each other, and practically every residue of dirt and very short fibres has been eliminated. At the end of the machine the thin fleece is gathered up into a flat riband or tape of soft cotton-wool, about half-an-inch thick, called a ' sliver ', and deposited in coils in an upright receiver of metal or other material.

This is the end of the process for cleaning and opening out the cotton fibres, unless the aim is to spin fine counts of yarn, in which case three other machines are here interposed ; these are first a ' sliver lap ' machine, then a ' ribbon lap ' machine which produces a ribbon-like lap or fleece of cotton wound on a wooden

BALE BREAKING



SCUTCHING MACHINES

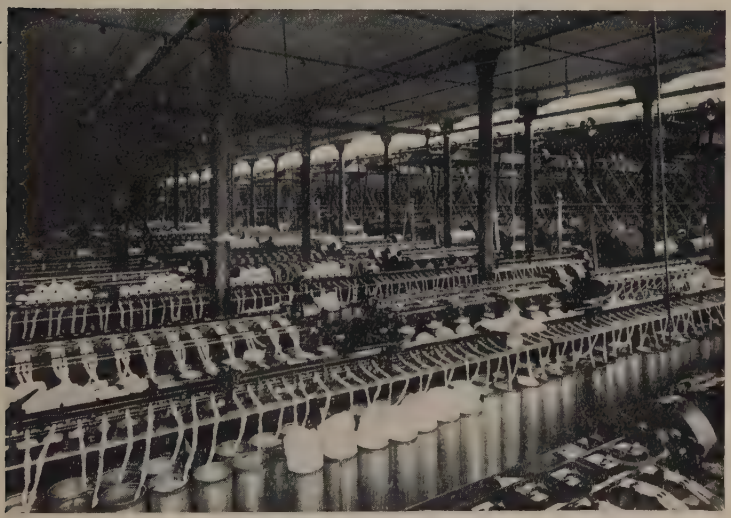
cylinder about nine inches wide; lastly, in this subsidiary process is the 'comber' itself, the object of which is to comb the fibres by means of fine needles, ensure almost perfect parallelism among them and get rid of the short and broken fibres, which would not be suitable for the spinning of fine yarns. The result of all this subsidiary work is still a sliver; but it is now a more perfect riband of selected fibres.

From the carding engine, or from the comber, the sliver is taken in the receivers to the 'drawing frame', the object of which is to attenuate it from a thick tape into a thin thread, to make the fibres lie even more strictly parallel, and especially to regularise the final thread and to ensure the obviation of thick and thin places. The slivers are made to pass through rollers, and a number of slivers are combined into one. Sometimes six slivers are rolled into one, but occasionally eight are combined, and this process is repeated three times; thus, 216 ($6 \times 6 \times 6$) or 512 ($8 \times 8 \times 8$) slivers are ultimately combined into one riband or sliver, which is now as uniform in thickness throughout as possible, and the threads of which are as parallel as man can make them. The 'slubbing', intermediate, and 'roving' frames continue this work. Sets of small rollers draw out the sliver into a longer and longer, and all the time thinner, cord of cotton; this is done by making the second set of rollers revolve more rapidly than the first, and the third set more rapidly than the second.

In the slubber the material is for the first time wound upon a bobbin. The process is repeated in the intermediate machine, the 'rope' of cotton becoming finer than at the slubbing stage; and in the roving frame it becomes finer still. This is the end of the preparatory processes, and the parallel cotton fibres have been made into an attenuated rope of regular thickness throughout, and the cotton is now ready for the important stage of spinning, the object of which is to convert the material into what is called yarn, or continuous threads.

The important and wonderful process of spinning is carried out by the one or the other of two of the most perfect machines ever invented—the ring spindle frame and the self-acting mule

frame. These are the machines of Arkwright and Crompton, supplemented by many minor improvements and additions. From the last of the roving frames the cotton, in bobbin form and having had enough 'twist' put into it to keep it on the bobbin, goes to one or other of these great machines.



SLUBBING MACHINES

The 'ring frame' is a continuous spinner and winder, which consists essentially of sets of three pairs of rollers through which the cotton 'rope' passes and where it is further drawn out, a series of rings upon each of which a small piece of wire revolves, and a set of spindles revolving at 5,000 to 10,000 times per minute, and each of them carrying a bobbin to receive the spun yarn. The rapid revolution of the bobbin spindle twists the cotton fibres as they issue from the last pair of rollers into firm thread.

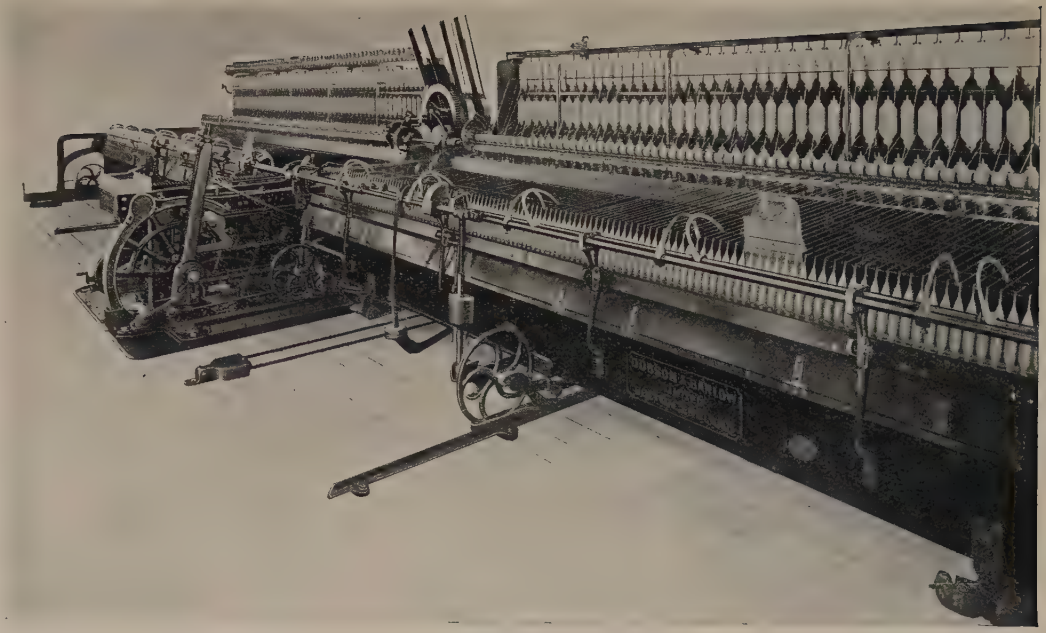
In the 'mule frame' the cotton cord is also passed between rollers of varying speeds, so as to draw it out finer as in the ring

frame. The spindles are mounted on a travelling carriage which moves outwards away from the delivery rollers to a length of 60 or 66 inches, the spindles meanwhile revolving at a speed of 9,000 per minute, without winding up the yarn. When the carriage reaches its farthest point the spindles continue to revolve for a short time and so put a twist into the yarn. Then the carriage moves back again and the spindles, now revolving much more slowly, wind on the yarn, which had been stretched and twisted on the outward journey of the carrier, into ' cops ' of the correct shape. A mule may be about 120 feet long and have 1,200-1,300 spindles, each spinning about 64 inches of thread in about 15 seconds, and such a mule frame may spin as much as 4,000 miles in a day.

There were about 60,000,000 spindles on ring frames and mules in 1923, but many of them were only working $26\frac{1}{2}$ instead of about 44 hours per week. These machines turned out not only the yarn to supply the cotton mills of the British Isles, but they exported over 200,000,000 lbs. of yarn valued at £26,500,000 in that year.

The fineness of yarn is reckoned in ' counts ', which show the relation between the length of yarn and weight. 840 yards of yarn make what is called a hank ; the number of hanks required to weigh 1 lb. is the ' counts ' of the yarn. It is obvious that the higher this number the finer will be the threads and *vice versa*. For example, 20's counts of yarn means that 20 hanks (that is, 20×840 yards $= 16,800$ yards) weigh 1 lb. Similarly, 80's counts means that 1 lb. of yarn contains 80 hanks (80×840 yards $=$ 67,200 yards). American cotton can be spun up to about 80's counts, Egyptian cottons up to 200's counts. In an interesting booklet published by Messrs. Horrockses, Crewdson & Company, it is stated that for experimental purposes 1 lb. of cotton has been spun into 1000 miles of yarn—which would make it over 2000's counts !

A special development of spinning may be mentioned here. Up to this point we have dealt with yarn in the condition of ' single threads ', but there is now a great demand for ' doubled



A SPINNING MULE

yarns'. These are made by twisting together two or more yarn threads. These are usually, but not always, of the same counts; they may be selected of different quality, different in twist, and of different colours. For example, the yarn required for 'Grandrelles' may be made of blue and white threads twisted together, or may even be blue with white and red in smaller quantities. There are many kinds of doubled yarns of which the single component threads are different in some of the fundamental characteristics; these are spun so as to obtain some special effect, and yarns thus made are known as 'fancy yarns'.

Another modification is often introduced at this stage. Yarn, in its natural condition, has standing out from it tiny, irregular hairs which give it a more or less rough feel. To make the yarn absolutely smooth and even, it is passed, while travelling at a great velocity, through a gas flame, where the gas is burnt in a flame of the bunsen type. This singes off the small, hairy irregularities and makes the yarn of the smoothness required for certain special work; this process is called 'gassing'. In the regular advertisements of the trade it is common to see a firm described as 'doublers and gassers'; especially is this the case in the Stockport district, where this process is extensively carried on. Single yarn is occasionally subjected to the gassing process, but generally, however, the yarn has been doubled before it is passed through the gas flames.

Yarn is sometimes subjected to the process called 'mercerisation' before it goes to the weaver; this means that it is passed, whilst being firmly stretched, through a strong solution of caustic soda. The action of caustic soda on cotton was discovered by John Mercer (1791-1866), who began to earn his living at the age of nine as a bobbin-winder and ended as a Fellow of the Royal Society,[1] in the middle of the last century, and the process is called after his name. If the yarn threads were not stretched and firmly held the action of the alkali would make them thicker and shorter; but the tension combined with the action of the caustic soda causes them to acquire a silky appearance. Such

JOHN MERCER

[1] Mercer was a typical East Lancashire inventor. He had few early advantages. He learnt reading, writing and arithmetic from a workman in a neighbouring print-works. In 1807 an orange-coloured frock his infant brother was wearing 'set him all on fire to learn dyeing.' He began experimenting. It was thirty years since Joseph Priestley, son of a Leeds cloth-dresser, had founded the science of modern chemistry, and the reading of James Parkinson's *Chemical Pocket-Book* introduced Mercer to a new world. He became a workman at the Oakenshaw Print Works, and after some vicissitudes and much hard work so impressed the owners, Messrs. Fort Brothers, that in 1825 he was taken into partnership. This connection lasted till 1848, during which time Mercer's output of work and of discoveries was colossal. He knew Cobden, who acted for a time as Messrs. Fort's London agent, and was a friend of the famous chemist, Lord Playfair. His big discovery was the action of alkalies on cotton, which led to the modern process which bears his name; but he also discovered many other processes, and explained several remarkable chemical reactions. As a man he was religious and eminently lovable—when made a J.P. in 1861, his friends said he was 'too merciful for a magistrate'—and, like Crompton, he was a skilful musician.

W.W.

yarn is called mercerised yarn ; Egyptian cotton yarn lends itself to the process better than American cotton.

For the weaving of some kinds of cloth, bleached yarn is preferred to that which is of its natural greyish colour. The bleaching of cotton is invariably done by chlorine in the presence of water ; it is not so with wool and silk. The cotton yarn goes through a series of operations which can be readily understood, and which are as follows : First the yarn is well boiled with water, to remove any impurities which may be soluble in water, and to get rid of any charred fragments left after the gassing process. In the second operation the yarn is boiled for some hours in a bath of milk of lime ; this is called in the trade the ' lime-boil '. After this it is again well washed in water, followed by a bath of dilute acid, which neutralises any lime left in the yarn. Then the cotton is boiled in caustic soda and soap, to get the surface into proper condition. It is now ready for the chlorine or ' chemicking ' process, which consists of a thorough soaking in a solution of bleaching powder. Lastly, the yarn is given another acid bath, known in the works as the ' white sour ' ; the acid in this bath acts upon the bleaching powder and sets free the chlorine which, in the presence of water, does the bleaching. All that then remains to be done is to wash the yarn with water and dry it.

The yarn, before it goes to the weaver, is often dyed ; this dyeing may be done to the yarn in the form of a hank, or in the cop or other roll, or on the beam. In the case of cop and beam dyeing, the dye liquor is slowly drawn through the wound-on yarn by suction, and special mechanical arrangements are made to facilitate the thorough and even penetration of the liquor. A form of dyeing at this stage is that of warp dyeing ; here the yarn is arranged very much like a long even rope, with its threads straight and parallel ; such a rope of warp may be over 1000 yards in length. The warp is first prepared by boiling, as in all the other cases ; then it is drawn slowly through the tanks of dye liquor, and then over rollers to be squeezed, washed, and dried. The colours used include a wide range of chemical sub-

stances, most of them having to be preceded in the actual dyeing by what is called a mordant, that is, a chemical compound which combines with the dye and fixes it in the yarn in the form of an insoluble compound. Examples of the mordants used in yarn dyeing are alum, iron salts, chloride of tin, potassium bichromate, chromium acetate, and tannic acid.

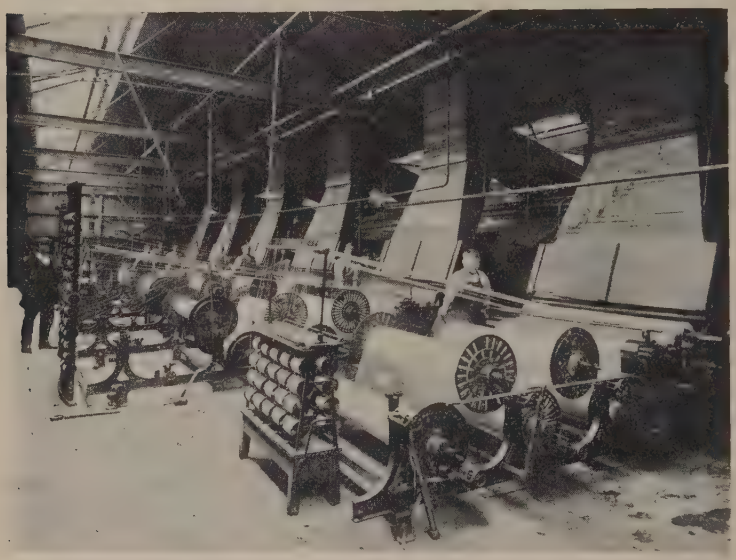
Of recent years there has been a considerable extension of the process of printing patterns on the warp ; at the later stages of weaving a weft of one colour is generally used, and the result is a subdued effect in printed colours which is now very popular.

The four chemical processes enumerated above as being applied to the yarn before it passes through the loom are also applied to cloth after it has left the loom ; that is, the grey cloth may be mercerised or bleached or dyed or printed. Some firms dye piece goods only, while others make a speciality of hank or cop or warp dyeing. Finally, under this head, we must notice that the dyeing is occasionally done in the raw cotton stage—that is, before the spinner or weaver has touched it ; and occasionally the dyeing takes place at one of the intermediate stages of the processes preparatory to the spinning.

And now the yarn is ready to be treated as warp and weft and to be prepared for the loom. Stronger yarn is required for the warp than for the weft, because the threads have to stand more strain. The proper adjustment of the relative strengths of the two yarns to be used is one of the most important things in the weaving industry ; the aim must be to make them so that one will not chafe or wear away the other. The yarn for the warp needs further preparation before it is ready for the loom ; it has to go through the process known as ' beam warping '—that is, the winding of a definite number of threads on to a beam or roller. Then a number of these warpers' beams are taken together and the threads from each are unwound and passed through a sizing machine. In this machine there is a sizing mixture through which the threads have to pass and with which they become impregnated, the object being to strengthen them and make them weave better, increase their weight, impregnate

them with antiseptics to prevent mildew, and impart the peculiar smooth feel which is preferred in the trade.

Sizing mixtures vary greatly in composition, almost every sizer having mixtures of his own adapted to his particular class of goods. The materials used in sizing are : Sago, starch, flour,



SIZING MACHINES

farina, resins, natural gums, gum tragasol, tallow and other fats, waxes, zinc chloride, magnesium chloride, Epsom salts, salicylic acid, boric acid, kaolin or china clay, barytes. It is obvious that an infinite variety of mixtures can be made from these. The threads then pass forward over great, hot cylinders, where they are thoroughly dried before being wound on the weaver's beam.

The process of weaving is fundamentally the same in the most complex modern loom as it is in the simplest loom used by an African native. It consists essentially of crossing or interlacing one set of threads with the others, that is, the *warp* threads are

to be crossed at right angles with the *weft* threads. Let the long straight lines numbered 1 to 11 in the figure represent eleven warp threads, and suppose a continuous weft thread to be drawn under and over them alternately ; in the row (*a*) the weft thread passes under the odd numbers 1 to 11 and over the even numbers 2 to 10

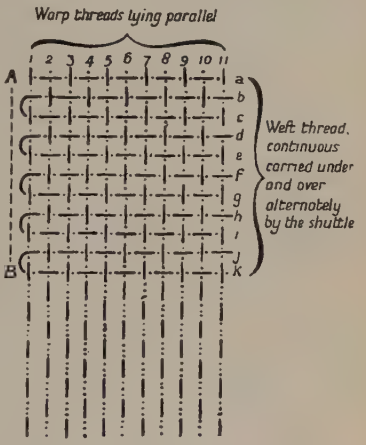


FIG. 9.—Diagram of a Plain Weave, known also as a Calico Weave or a Tabby Weave.

The threads which are *under* are shown by dots.

Imagine the threads to be pushed closer together into say, one-fourth of the distance from top to bottom *A* . . . . *B*, and one-fourth of the distance from right to left of the diagram. It would then give the impression of a tightly woven cloth. It is left fairly open in the diagram so that the non-technical reader may readily understand the principle of a plain weave.

of the warp threads ; in the next weft row (*b*) it passes under the even numbers and over the odd numbers, and so on with all the other rows of weft, *a*, *c*, *e* being alike, and *b*, *d*, *f* alike. This is the *principle* of a plain weave, and three distinct *operations* are necessary in the loom to carry it out and make the cloth.

The first is an arrangement to lift the threads alternately, first 1, 3, 5, 7, 9, etc., then 2, 4, 6, 8, 10, etc., and so allow a passage for the weft shuttle. This is called ' shedding ', or making a ' shed ', and is done by means of shafts of healds which are lifted alternately by a mechanical device. The second operation is passing the weft shuttle through the shed from one side of the warp to the other. Each passage of the shuttle is called a ' pick ' and the operation is called ' picking '. In one pick the shuttle passes under the threads 2, 4, 6, 8, 10, etc. ; then these are depressed and the others are lifted, and as the shuttle is sent back

it passes under the threads 1, 3, 5, 7, 9, etc. This operation is also carried out mechanically, a picking rod or picking stick armed with a flexible band and a specially made tool called a 'picker' sending the shuttle from one side to the other. The third necessary operation is to 'beat up' the picks of weft close together, that is, to close (*b*) against (*a*), (*c*) against (*b*), etc., the closeness varying, of course, in different kinds of cloth.

There are other accessory but important motions in a loom, but shedding, picking, and beating up are the essential ones. These motions must be perfectly adjusted to each other or the loom will not weave; hence, a modern power-loom is a most carefully made and delicately balanced machine. The mechanic who is in charge of a group of looms (about eighty on an average) in a weaving shed must be a skilled workman, and he should understand the structure of a loom thoroughly, for on his skill and judgment the smooth working of the weaving factory largely depends; he is popularly called a 'tackler' in the trade.

In the plain, simple weave explained above the threads lift alternately, 1 and 3, etc., 2 and 4, etc. This only requires two shafts or rows of healds. By increasing the number of shafts and arranging a mechanical device to lift them in some definite order other effects may be produced; thus, by using four heald shafts, it is possible to raise and lower the warp threads in progression—that is, the warp threads 1, 5, 9, 13, 17, etc., at the first lift, 2, 6, 10, 14, 18, etc. at the second lift, 3, 7, 11, 15, 19, etc. at the third lift, and 4, 8, 12, 16, 20, etc., at the fourth. This gives what is called a twill effect, that is, there is a diagonal marking produced on the face of the cloth. By increasing the number of shafts greater variety may be obtained, as may be seen from the diagram (Fig. 10), which is drawn in the familiar way in which designs are often shown in the weaving industry.

There are many other devices for producing different appearances in the woven cloth. Even in a plain weave it is easy to see that variety may be introduced according to the closeness of the warp threads or weft threads or both. Then all the warp threads need not be equally close to each other, nor need they be all alike

AN EARLY WEAVING SHED

in nature and in counts ; thus striped and ribbed (or cord) effects may be produced. Further, the warp threads may be of different colours, having been wound on the weaver's beam according to some plan or design. The loom may have two warp beams whose warp threads pass through healds and furnish the groundwork of the woven cloth ; suppose one of these beams is subject to much greater tension than the other, then there will be in the cloth an

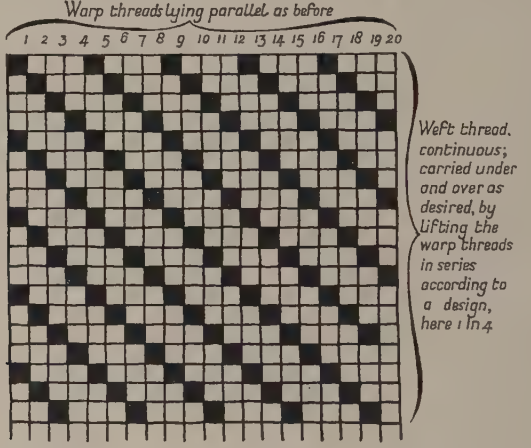
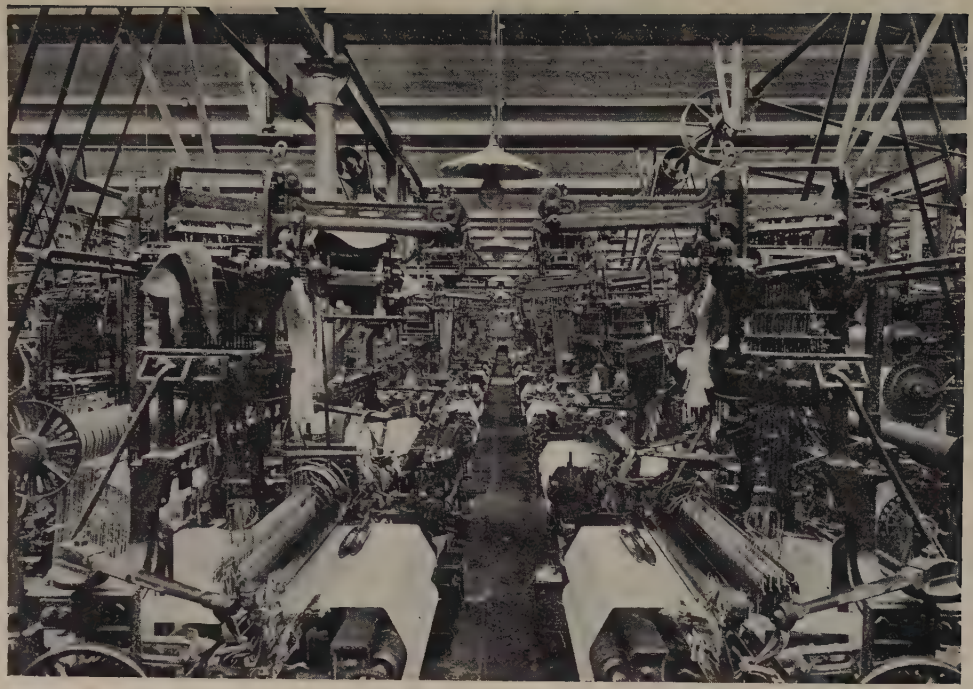

Warp threads lying parallel as before
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Weft thread, continuous; carried under and over as desired, by lifting the warp threads in series according to a design, here 1 in 4

FIG. 10.—Diagram of a twill weave on what is called in the industry design paper or point paper. The vertical columns represent continuous wrap threads lying parallel after coming through the healds ; the horizontal spaces represent the one weft thread. In this diagram the black squares represent where the warp is *over* the weft.

alternation of warp threads, some of which are tight and some of which are slack. All these effects may be still further complicated by using more than two shafts and introducing varied twill and sateen effects. Further, it is clear that, in a simple twill weave with four shafts, two distinct groupings are possible ; of the four shafts, one may be lifted at each pick and three left down ; on the other hand, three may be lifted and one left down ; the one method brings more weft to the upper surface of the cloth, the other more warp. This principle is capable of extension in more complex weaves.



A MODERN WEAVING SHED

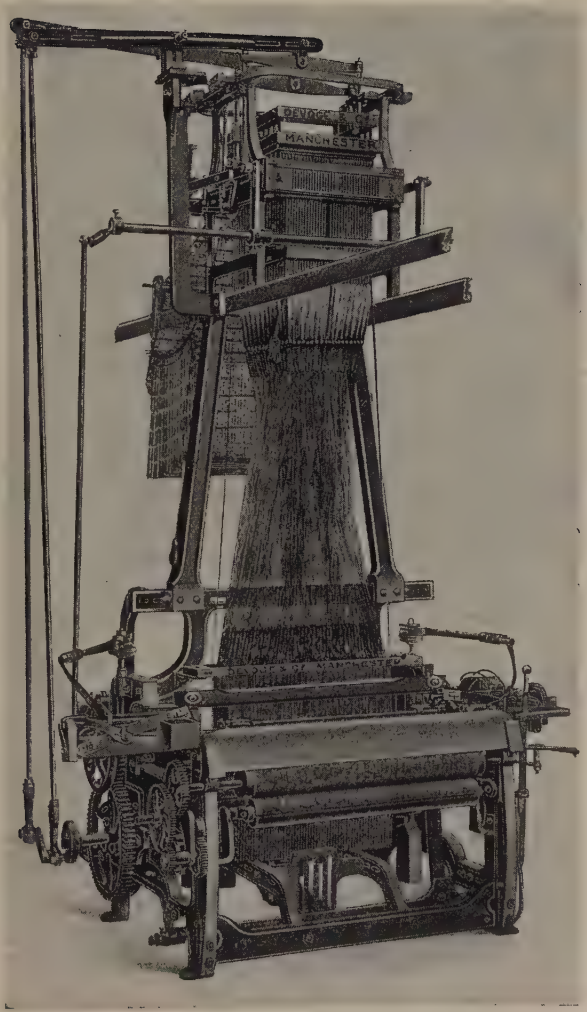
It is not convenient, as a rule, to have more than ten heald shafts in a loom, worked by tappets at the end or by springs in the middle ; the ordinary numbers are 2, 3, 4, 5, 6 and 8. If the heald shafts are to be more than 10 they are usually operated by a machine, or ' engine ', called a ' dobby ', which is placed on a frame above the loom.[1] Dobbies will control anything up to 24 heald shafts, and it will be readily understood that a very great variety of patterns of weave may be made by their combinations. For patterns which are beyond the scope of the dobby, the ' Jacquard loom ' is used. Here every single heald lifts independently instead of in whole rows or shafts as in the plain looms, twill motions, and dobbies ; the lift of each heald is controlled by perforations in a set of cards, each card representing one pick of the loom. These looms will produce patterns of the most amazing intricacy, which may be still further varied by introducing differences in warp and weft. There is absolutely no end to the variety of patterns which may be produced in modern looms.

It will readily be understood that there is a bewildering variety of cotton fabrics put on the market, this variety being determined by the inter-relation of counts of warp and weft, number of picks and of warp threads per inch, type of weave, variety of colour and character of finish. An enumeration of the names would be a mere catalogue, and an explanation of them all would be a sort of technical encyclopaedia. New names are continually being coined to keep pace with the new designs and varied weaves which this branch of the industry must invent if it is to hold its own, and the layman is lost amongst this host of names. At the risk of seeming invidious, six of the commoner are selected from the long list in regular use.

Bedford Cords. These are fabrics with ribs running lengthways of the piece (*i.e.* warp way), 27 to 42 inches wide, 80 to 100 warp threads per inch, about 80 picks or weft threads per inch, plain weave, heavily sized.

Burnley Printers. These are grey cloths, woven plain,

[1] More rarely *under* the healds.



THE JACQUARD LOOM

about 30 inches wide. A popular kind has 72 warp threads per inch and 62 picks or weft threads per inch, of about 40's counts of yarn. Coloured patterns are printed on these by the calico printers, and then enormous quantities are shipped to India, further India, China and South America.

Cambrics. These are fine cloths of plain weave, about 40 inches wide, 90 to 100 warp threads of 60's counts, and about 100 picks (weft threads) of 50's counts per inch. They are generally made of Egyptian yarn.

Gaberdines. This is now a generic name given to a large class of goods in which there is a twill weave so arranged that the twill effect stands out boldly ; they are woven in different qualities, generally 56 inches wide, 90 to 100 warp threads per inch, of about 20's warp yarn, and 80 picks per inch of about 20's weft. Sometimes they are made of doubled yarn ; often in self colours which should be fast to washing. Gaberdines are used largely for rainproof coats. Some narrower kinds (31 inches) are made of finer and better quality yarn.

Poplins. These are usually of a plain weave. There is a large number of warp threads and a low number of weft threads per inch. This gives the effect of fine ribs across the piece. Usually two-fold yarn is used for both warp and weft, and good quality is necessary. An example is 140 warp threads per inch, of two-fold 70's warp yarn, and 48 picks per inch of two-fold 60's weft yarn. Heavy makes are used for dresses and light makes for blouses. They are also largely used for good shirtings.

Sateens. This is a name used for a very large and varied class ; usually woven as five shaft twills, with peculiar lifts of the heald shafts. By using yarn twisted warp way for weft, and twisted weft way for warp, and thus ringing the changes, various effects are produced. They are made in different widths, from 31 to 56 inches, 72 to 80 warp threads of 36's yarn per inch, about 116 picks of 38's weft yarn per inch. Such cloths are both dyed and printed, and are largely used for lining men's suits, etc.

The loom in a weaving shed may be from 14 inches in width up to 140 inches, by far the larger number being between 26 and

62 inches. The narrow looms are made to ' pick ' more rapidly than the wide looms, and the rate of the pick also depends upon the complexity of the weave of the cloth, and whether the warp reed is fast or loose. Some looms make 250 picks per minute, that is, the shuttle flies across the shed four times per second, but this is rare. A loom 30 inches wide is usually driven at 180 to 200 picks per minute.

A weaver may be in charge of two, three, four or six looms, according to the width and the character of the looms and, of course, the ability and ambition of the weaver. Very few weavers have only two looms, and then it is because they are unusually wide looms, or because the weaver is in the learning stage. The looms are frequently placed in groups of four, and this is the common number under the charge of an adult weaver, man or woman. Six-loom weavers have generally, but not always, a learner or tenter to help.

Cotton mills are of two general kinds ; the preparatory processes and spinning are usually carried on in big mills, some of which are of enormous size and of several storeys. Weaving is usually done in specially constructed mills of one storey, lighted from above, so that the weavers will have a good top light for the very particular operations of the loom. There are many weaving sheds in Lancashire which contain over 1000 looms, the number occasionally running up to 2000.

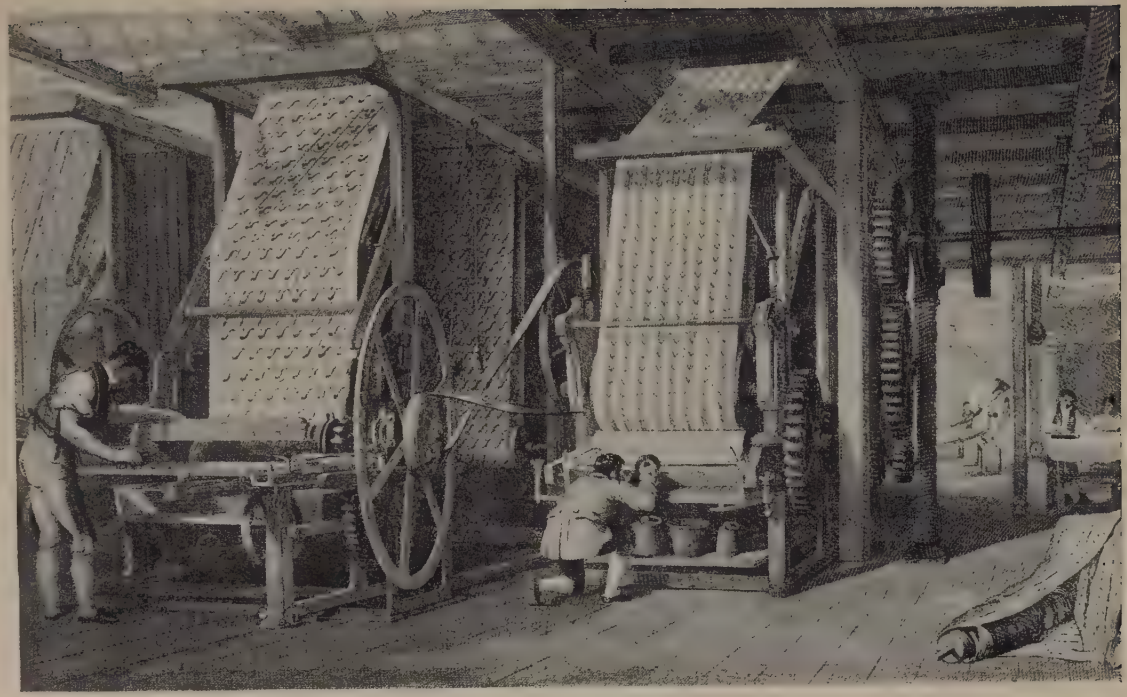
Now the two great processes necessary to make a piece of cotton cloth are complete, but the material is rarely sold direct to the wearer at this stage—there are still other processes through which it must pass. These generally consist of the application of textile chemistry in one form or another, aided by mechanical processes, some of which involve inventions only a little less wonderful than those which we have already met with.

The first group of these later processes through which the cotton cloth must pass has already been indicated ; these are bleaching, mercerising, dyeing—sometimes one only, sometimes two of them. As we have learnt before, these are carried out either in the yarn stage or on the woven cloth. The yarn or the

cloth passes to the bleachers, mercerisers or dyers—some of whom carry out all of these operations, whilst others specialise more closely. Some account of the general distribution of these works is given in Chapter VII.

There are two processes which are carried out of necessity on the woven goods ; these are calico printing and the group called 'finishing'. Calico printing is a most wonderful art, and some of the results produced by the calico printers of Great Britain are really marvellous. It is a complex art which has grown up, as all such arts have grown, process by process, and only the most elementary idea can be given here. In the early days the patterns were impressed on the cloth by means of hand blocks, and for some special work hand printing is still done. A great modification came in the early days of the Industrial Revolution, when roller printing was introduced. In this process the cloth is made to run round a large cylinder where it meets one or more copper rollers which have patterns engraved upon them. These copper rollers have the colour paste impressed on them, any excess being scraped off by a knife as the roller is revolving, and before it meets the cloth on the large cylinder. The engraved roller with its colour paste, in its further rotation, is pressed against the prepared cotton cloth, and the colour leaves the roller and is deposited upon the cloth. One colour is printed in that way ; a second roller repeats the process with another colour, and so on until there may be as many as twenty copper rollers which have contributed their share of the coloured pattern. It is obviously a mechanical problem to make all these additions fit the pattern accurately. When the last engraved roller with its colour paste has done its work, the cotton cloth leaves the face of the large cylinder and passes through the necessary operations for fixing the different colours on the fibre.

Sometimes the whole ground of a piece of calico is required to be of one colour ; in this case it is first dyed and the patterns are afterwards printed on it by applying pastes which destroy the colour ground where they touch it and leave another colour in its place. This is known as discharge printing, and there are



CALICO PRINTING
From an engraving of 1835

modifications which are not readily followed by the layman. The whole art is one involving great skill, and demands the work of managers and artisans of great knowledge and experience. The artists who design the continually changing range of patterns, the engravers who prepare the copper rollers, the men who mix the colours and select the right mordants, and the mechanics who adjust the delicately balanced machinery so that the parts of the patterns 'fit' exactly—all these are men and women of great skill and long training.

Many great names have been associated with the calico printing branch of the cotton industry, among which may be mentioned Playfair, Mercer, Lightfoot, the Peels, and the Grants. The great chemist, Dr. Lyon Playfair, afterwards Lord Playfair, was for a time chemical manager of Thomson's Calico Works at Primrose, near Clitheroe, and he and Mercer used to meet once a week at Whalley at a small scientific club. He next thought of migrating to Toronto, but was dissuaded by Sir Robert Peel. His share in helping to organise the Great Exhibition of 1851 [1] brought him into personal touch with the Prince Consort, and he supported the Prince's efforts to give the nation technical instruction in applying science to industry. When the Department of Science and Art was formed in 1853 he became Secretary for Science, and he used his influence in Parliament all along to advance education, as zealously as he used it to improve social and sanitary conditions. Lightfoot, as a result of four years' work at Broad Oak Works, Accrington, discovered Aniline Black in 1863, and wrote the vindication of his claims concerning it (which the verdict of history has ratified) from Lower House Print Works, Burnley. He was the first mayor of Accrington. One of the great Robert Peels was called 'Parsley Peel' because of the famous 'Parsley Pattern' turned out by his firm, a pattern which became known all the world over. The Brothers Grant were the prototypes of Cheeryble Brothers in Charles Dickens' *Nicholas Nickleby*; they bought the business of Peel, Yates & Company in the Irwell Valley, and a tower,

[1] cf. *Western Races and the World*, edited by F. S. Marvin, Chap. VI.

called ' Grant's Tower,' is a famous landmark in the district to this day.

Finishing is a general term including a whole set of operations which change the degree of smoothness, the lustre, and very often the weight of the cloth. As a rule the first process is singeing, in which the cloth is led over red-hot plates or through a gas flame. This process burns off loose hairs, and gives an even feel and appearance to the face of the cloth.

Two of the other well-known finishing processes are those of calendering and schreinering. In calendering the cloth is passed through various kinds of friction rollers, which are not only geared to run at different rates but also to exercise varied pressure. In some processes the cloth is filled with some sort of material, may be a chemical or mixture of chemicals such as china clay, barytes, starches or gums, before it goes through the calender rollers. In the Schreiner process the steel rollers are engraved with a great number of fine lines all running parallel to each other ; the great pressure to which the cloth is subjected cuts the face into close and fine lines in such a way that the light is similarly reflected from all parts of the surface. This gives a peculiar sheen which has now a great vogue.

The finishing processes which produce flannelette effects, and those which depend upon hammering the cloth against itself so as to produce a peculiar evenness of structure, are other ' finishes ' which are well known. There is a great variety in which additions of filling material, ironing effects, pressure with heat, damping, are among the means adopted to give to the cloth—as pointed out already—some particular kind of feel or appearance. With the completion of the finishing stage the cloth is ready for the Manchester warehouse, and the development from the boll of raw cotton to the cloth is complete.

IX

THE LANCASHIRE COTTON FAMINE

With the new era opened by the repeal of the Corn Laws and the advent of Free Trade the lot of the workers in the manufacturing districts improved. Statistics are often misleading, but some idea of the improvement can be gleaned from the following particulars of the average weekly wages earned in the cotton trade in the years 1839, 1849 and 1859.

	1839. (Week of 69 hours.)	1849. (Weeks of 60 hours.)		1859. (Weeks of 60 hours.)	
	s	*s.*	*d.*	*s.*	*d.*
Steam-engine tenters	24	28	0	30	0
Warehousemen	18	20	0	22	0
Carding Department.					
Scutchers (women and girls)	7	7	6	8	0
Strippers (young men)	11	12	0	14	0
Overlookers	25	28	0	28	0
Spinning on Self-acting Mules.					
Winders	16	18	0	20	0
Piecers (women and young men)	8	9	0	10	0
Overlookers	20	22	0	26	0
Throstle Spinning.					
Spinners (girls 14-18 years)	4	4	6	5	0
,, (women)	7	7	6	9	0
Overlookers	18	20	0	24	0
Reeling.					
Throstle reelers (women)	9	9	6	9	6
Warpers	22	22	0	23	0
Sizers	23	23	0	25	0
Doubling.					
Doublers (women)	7	7	6	9	0
Overlookers	24	25	0	28	0

On the Continent England's industrial prowess was universally acknowledged. At that time she was far ahead of other nations in machinery and output. It was, perhaps, a sign of the times that the future Czar of Russia, Nicholas, when he visited England went to inspect, not her ship-building, like his ancestor Peter the Great, but the improvements Robert Owen was carrying out in the cotton mills at New Lanark. Of the admiration in which our

machinery was held Alexander William Kinglake, the historian of the Crimean War, gives an amusing picture in his book, *Eothen* (published 1844). *Eothen* is an account of a tour in the East. At Belgrade he called on the Pasha to obtain leave to continue his journey. 'The Pasha', writes Kinglake, 'was particularly interested in the vast progress which had been made in the application of steam, and appeared to understand the structure of our machinery. He remarked upon the gigantic results of our manufacturing industry, and showed that he possessed considerable knowledge of our Indian affairs'. He then gives an amusing sketch of the kind of conversation that took place—the dragoman being the interpreter.

'*Pasha.*—The Englishman is welcome; most blessed among hours is this, the hour of his coming.

Dragoman (to the Traveller).—The Pasha pays you his compliments.

Traveller.—Give him my best compliments in return, and say I'm delighted to have the honour of seeing him.

Dragoman (to the Pasha).—His Lordship, this Englishman, Lord of London, Scorner of Ireland, Suppressor of France, has quitted his governments, and left his enemies to breathe for a moment, and has crossed the broad waters in strict disguise, with a small but eternally faithful retinue of followers, in order that he might look upon the bright countenance of the Pasha among Pashas—the Pasha of the everlasting Pashalik of Karagholookoldour.

Traveller (to his Dragoman).—What on earth have you been saying about London? The Pasha will be taking me for a mere Cockney. Have I not told you ALWAYS to say, that I am from a branch of the family of Mudcombe Park, and that I am to be a magistrate for the county of Bedfordshire, only I've not qualified; and that I should have been a deputy-lieutenant, if it had not been for the extraordinary conduct of Lord Mountpromise; and that I was a candidate for Boughton-Sodborough at the last election, and that I should have won easy if my committee had not been bribed. I wish to heaven that if you *do* say anything about me, you'd tell the simple truth!

Dragoman—(is silent).

Pasha.—What says the friendly Lord of London ? Is there aught that I can grant him within the Pashalik of Karagholookoldour ?

Dragoman (growing sulky and literal).—This friendly Englishman—this branch of Mudcombe—this head purveyor of Boughton-Sodborough—this possible policeman of Bedfordshire—is recounting his achievements and the number of his titles.

Pasha.—The end of his honours is more distant than the ends of the earth, and the catalogue of his glorious deeds is brighter than the firmament of heaven !

Dragoman (to the Traveller).—The Pasha congratulates your Excellency.

Traveller.—About Boughton-Sodborough ? The deuce he does ! —but I want to get at his views in relation to the present state of the Ottoman Empire. Tell him the Houses of Parliament have met, and that there has been a speech from the Throne pledging England to maintain the integrity of the Sultan's dominions.

Dragoman (to the Pasha).—This branch of Mudcombe, this possible policeman of Bedfordshire, informs your Highness that in England the talking houses have met, and that the integrity of the Sultan's dominions has been assured for ever and ever by a speech from the velvet chair.

Pasha.—Wonderful chair ! Wonderful houses !—whirr ! whirr ! all by wheels !—whiz ! whiz ! all by steam !

Traveller (to the Dragoman).—What does the Pasha mean by that whizzing ? He does not mean to say, does he, that our Government will ever abandon their pledges to the Sultan ?

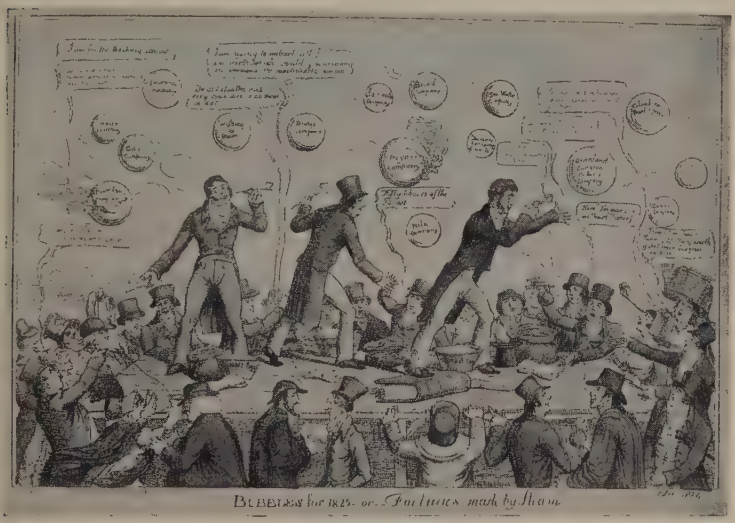
Dragoman.—No, your Excellency, but he says the English talk by wheels and by steam.

Traveller.—That's an exaggeration ; but say that the English really have carried machinery to great perfection. Tell the Pasha (he'll be struck with that) that whenever we have any disturbances to put down, even at two or three hundred miles from London, we can send troops by the thousand to the scene of action in a few hours.

Dragoman (recovering his temper and freedom of speech).—His Excellency, this Lord of Mudcombe, observes to your Highness, that whenever the Irish or the French, or the Indians rebel against the English, whole armies of soldiers and brigades of artillery are dropped into a mighty chasm called Euston Square, and, in the

biting of a cartridge, they rise up again in Manchester, or Dublin, or Paris, or Delhi, and utterly exterminate the enemies of England from the face of the earth.

Pasha.—I know it—I know all; the particulars have been faithfully related to me, and my mind comprehends locomotives.



From a satirical print.

The armies of the English ride upon the vapours of boiling cauldrons, and their horses are flaming coals !—whirr ! whirr ! all by wheels !—whiz ! whiz ! all by steam !

Traveller (to his Dragoman).—I wish to have the opinion of an unprejudiced Ottoman gentleman as to the prospects of our English commerce and manufactures; just ask the Pasha to give me his views on the subject.

Pasha (after having received the communication of the Dragoman).—The ships of the English swarm like flies; their printed calicoes cover the whole earth, and by the side of their swords the blades of Damascus are blades of grass. All India is but an item in the ledger-books of the merchants whose lumber-rooms are filled with ancient thrones !—whirr ! whirr ! all by wheels !—whiz ! whiz ! all by steam ! '

In spite of the whole earth being covered with English printed calicoes it was dawning on some minds that the great cotton manufacture, drawing its raw material from one hemisphere and selling it in the other, was becoming top-heavy. Between the years 1840 and 1860 the American cotton crop increased by 100 per cent.; but during the same period the number of spindles employed in England and the Continent increased by 150 per cent. Moreover, more than 70 per cent. of the raw cotton imported into England in these years was American cotton from the United States. This state of things was new. Arkwright's water-frame and Hargreaves' jenny had come in 1770: ten years later they were followed by Crompton's mule. But ten years more were to pass ere the first bales of sea-island cotton from the Southern States caused the Liverpool Customs' Officers to rub their eyes. In those days we got most of our raw cotton from the West Indies: the first consignment of cotton from India was landed in 1783, and no direct supply was obtained from Egypt till after Waterloo. In the ten years 1801-1810 27 per cent. of our supply still came from the West Indies. After that the change was rapid. The following table shows how largely, by the middle of the century, the cotton industry had come to depend upon a single source of supply.

IMPORT OF RAW COTTON, 1841-1859.

	UNITED STATES		BRAZIL		EGYPT	
	No. of Bales	Per Cent	No. of Bales	Per Cent	No. of Bales	Per Cent
1841-50	1,190,260	75·41	113,320	7·16	51,940	3·30
1851-59 (9 years)	1,688,233	71·89	127,711	5·45	106,056	4·52

	WEST INDIES, &c.		EAST INDIES		TOTAL
	No. of Bales	Per Cent	No. of Bales	Per Cent	
1841-50	13,080	0·82	209,380	13·31	1,577,980
1851-59 (9 years)	9,100	0·38	417,244	17·76	2,348,344

Manufacturers were not altogether easy in their minds on the question of supply. America had come so to dominate it that prices of all descriptions were ruled by the supply from the United States. A large crop in America reduced not only the price of American cotton, but the value of the cotton produced in all other countries. Feeling this strongly, Mr. Thomas Clegg, of Manchester, established a native agency for the purchase of cotton on the West Coast of Africa. In 1852 he imported 1810 lbs., which had increased by 1857 to 35,419 lbs., and in 1859 to 70,000 lbs. Mr. Clegg's exertions typify one side of the uneasiness that was disturbing the minds of the more thoughtful employers. His advertisements indicate the other side, for he regularly announced on his billheads that he was prepared to supply cloths made of free-labour cotton. The two points of view were brought together and focussed in the formation of the Cotton Supply Association in 1857, with Mr. John Cheetham of Stalybridge as its first president; for 'the Cotton Supply Association originated in the prospective fears of a portion of the trade that some dire calamity must inevitably, sooner or later, overtake the cotton manufacture of Lancashire, whose vast superstructure had so long rested upon the treacherous foundation of restricted slave labour, as the main source of supply for its raw material'.[1] The Association was not idle. It sent out its pioneers, and established agencies in Turkey, Italy, Egypt, Spain, Portugal, Australia, Brazil, and South America. It distributed seed and cotton gins. But it was not supported by the Trade as it should have been. Within five years, however, the foresight of its promoters was to be demonstrated with dramatic suddenness.

For more than a century before the outbreak of the American Civil War there had been signs that opinion in England was turning against slavery. In 1698 Mrs. Aphra Behn, who had

[1] *Fifth Annual Report of the Cotton Supply Association.* After the event, *i.e.* after the outbreak of war, wisdom suddenly descended on many who had been blind before. The British Association met in Manchester two months after the war had broken out, and discussed the question of cotton supply in a chastened mood.

been brought up in Surinam and so had first knowledge of negro slavery, made it the theme of her first novel, *Oroonoko, or the History of the Royal Slave*. *Robinson Crusoe* (1719), which Defoe wrote at the age of sixty, was not without effect in teaching the white man to realise his brotherhood with the black.[1] From the days of their founder, George Fox, who first declared his views at Manchester in 1648, and later travelled in the West Indies, the influence of the Quakers was directed against slavery. William Penn's treaty with the Lenni Lenape Indians, on founding his colony of Pennsylvania, illustrates their attitude. In the literature of France and England in the eighteenth century the two greatest names are those of Voltaire and Dr. Johnson, and both condemned slavery. Johnson was particularly devoted to his own negro servant, Frank Barber. Boswell even owns himself rather shocked at Johnson's zeal. 'He had', he wrote in 1777, 'always been very zealous against slavery in every form, in which I with all deference thought that he discovered "a zeal without knowledge". Upon one occasion, when in company with some very grave men at Oxford, his toast was, "Here's to the next insurrection of the negroes in the West Indies"'! The influence of Wesley, who had been out in Georgia, was in the same direction. The poets, from Pope to Cowper, lent their aid; and, in the long trial of Warren Hastings, Burke's oratory on behalf of the Hindu further informed the public mind as to the existence of a 'white man's burden',—his duty to the coloured races with whom he came in contact—at the time when, across the Channel, Rousseau was writing of the brotherhood of man. Thus politics found themselves gradually coming into line with literature and religion on both sides of the Channel. If the Quakers led the way, the Abbé Raynal in his extremely popular *Histoire des deux Indes* hoisted the anti-slavery banner in the Roman Church, as Dr. Johnson's advocacy of the cause of the negro

[1] Defoe's French biographer and critic, Paul Dottin, discovers in *Robinson Crusoe* 'le grand principe du *White Man's Burden*. . . . De-Foe Robinson a une âme de colonisateur, et il laisse à ses successeurs un manuel de colonisation rempli d'idées nouvelles de liberté et de tolérance.' Cf. Dottin: *Daniel Defoe et ses Romans*. Vol. II, p. 480. (Oxford University Press.)

hoisted it in the Anglican ; for it may be said of Johnson that, ' though not in Orders, he did the Church of England better service than most of those who at that listless era ate her bread '.[1] By 1776—the year of the Declaration of American Independence—

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economists also had pronounced against slavery. In his *Wealth of Nations*, published in that memorable year, Adam Smith, writing of ' the unfortunate law of slavery ', pointed out that the condition of negro slaves in the West Indies was worse in the British islands, where a free form of government prevailed, than in the French, where the government was to a large extent

[1] Lord Mahon, *History of England*, 1713-1783, vol. vi. p. 313.

arbitrary, because in the former the magistrate, being less powerful was less able to protect the slave. 'Gentle usage renders the slave', he wrote, 'not only more faithful, but more intelligent, and therefore, upon a double account, more useful. He approaches more to the condition of a free servant, and may possess some degree of integrity and attachment to his master's interest, virtues which frequently belong to free servants, but which never can belong to a slave, who is treated as slaves commonly are in countries where the master is perfectly free and quite secure'.[1]

Meanwhile the Royal African Company continued to flourish. Liverpool and Bristol were the rival ports from which its business was conducted. The first slave ship from Liverpool sailed for Africa in 1709, and ninety-eight years later, when the Slave Trade was abolished, Liverpool had 185 vessels engaged. The trade was recognised, but hardly respected. In London the African House received from its neighbour, the East India House, the same half-contemptuous tolerance which, on the high seas, a haughty East-Indiaman would accord to a slaver flying the Royal African Company's flag.

The steady set of public opinion against negro slavery prepared the way for the practical work of Thomas Clarkson and William Wilberforce. Both were members of St. John's College, Cambridge, where Clarkson in 1785 won the Latin Essay Prize for an essay on the theme 'Is it right to make slaves of others against their will', and where, a few years earlier, Wilberforce formed a lifelong friendship with William Pitt, then an undergraduate at Pembroke Hall. Clarkson was the originator, investigator, and traveller of the movement—unearthing at Bristol and Liverpool horrors far beyond his wildest expectations, and travelling over Europe, even to the Czar, to impress on other governments the duty of abolition. Wilberforce was the leader of the crusade in Parliament, a position for which his lovable character (for no one could quarrel with Wilberforce), his moderation, his tenacity, and his host of influential friends especially fitted him.

[1] *Wealth of Nations*, Bk. IV., Chap. VII., Part II; and on the general theme of England's attitude, in the eighteenth century, towards slavery, cf. *Western Races and the World*, edited by F. S. Marvin, Chap. VI.

So far as the liberty of the negro in this country was concerned the case was won seven years before Clarkson wrote his prize essay. In 1772 it was decided in the Courts that as soon as a slave touched the soil of England he became free. The extent

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of the freedom was, however, questioned, and the great judge, Sir William Blackstone, suggested that, though a slave acquired his personal liberty, his master might still be legally entitled to his service. This question was settled by the Court of Session in Edinburgh, a great majority of the Lords of Session deciding for the negro. 'I cannot too highly praise', wrote Boswell, who was present, 'the speech which Mr. Henry Dundas generously contributed to the cause of the sooty stranger. . . . I do declare,

that upon this memorable question he impressed me, and I believe all his audience, with such feelings as were produced by some of the most eminent orations of antiquity'[1]. On the other side of the Channel the Convention in 1794 decreed the freeing of all slaves in French territory, but Napoleon reversed the decree. In England the slave trade was suppressed by the Ministry of All the Talents in 1807, but it was not till 1833 that Parliament passed the Act emancipating all slaves in British territory.

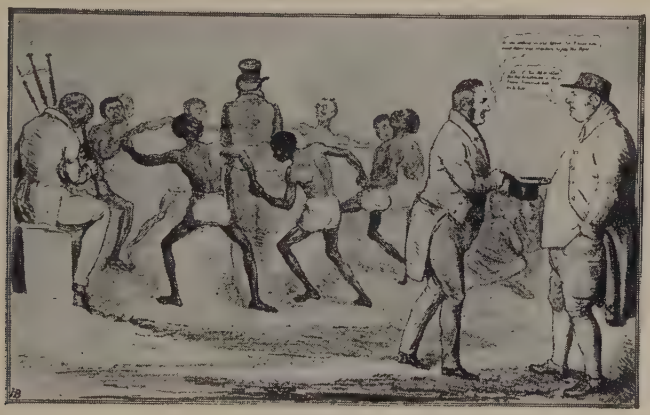
In America it had seemed probable, after the War of Independence, that slavery would die a natural death. Logic demanded it, for the general political philosophy was exalting the 'Rights of Man'. What turned the scale was the invention in 1793 by Eli Whitney of the cotton-gin. This invention made the cultivation of cotton more profitable and enormously increased it; for it made possible the use of shorter-stapled cotton, and thus made cotton-growing worth while on land hitherto considered unsuitable for it. The need for slaves at once increased. Hitherto slavery had been a domestic institution. By 1850 it was almost an industrial system. The question of its future could only be settled by the Americans themselves: by the famous 'Monroe Doctrine' of 1823,[2] they had not only re-asserted their own independence, but in no equivocal terms warned the old world to 'keep its hands off' America.

This was the time when the Mississippi Basin was being opened up. In 1820 Missouri sought admission to the union as a 'slave state'. It was a test case, for it lay on the border-line between the slave and non-slave states. Missouri was admitted as a slave state, but it was also laid down that in future slavery was not to be allowed north of latitude 36° 30′, the southern border

[1] Boswell, *Life of Samuel Johnson*, 1777. The support of Dundas was of importance to the cause. He was then Solicitor-General for Scotland, and was a rising politician. In 1791 he became Home Secretary, and three years later Secretary for War; he planned the Egyptian campaign of 1801, and in 1804-5 was First Lord of the Admiralty.

[2] In 1823 President James Monroe declared that the American Continents 'are henceforth not to be considered as subjects for future colonisation by any European Powers'.

of Missouri. This was the famous Missouri Compromise. After the war with Mexico, whereby the United States acquired a vast territory north of latitude 33°, extending away westwards to the Pacific, and was confirmed in its possession of Texas, the question of slavery came again to the front. Six years later, in the organising of the Kansas and Nebraska territories, a decision was once more evaded, and the inhabitants were left the right of deciding whether a state should come into the Union as a 'slave' or 'free'. This was virtually a victory for slavery. But Stephen Douglas,



On the left the liberated blacks dance round Sir T. F. Buxton. To the right John Bull is disturbed by a bill of £20,000,000.

the promoter of the Kansas-Nebraska Bill, in order to win the South, undertook to try to repeal the Missouri Compromise. This infuriated the North and welded the ranks of the opposers of slavery.[1] Shortly afterwards an army surgeon took two slaves, Dred Scott and his wife, into the free state of Illinois, and then, proceeding with them into Missouri claimed them again as slaves. They appealed for themselves and their children that, having lived in a free state, they were free. But the Supreme Court of the United States decided that slave-owners might take their slaves into any state in the Union without losing authority over

[1] Cf. Morris and Wood, *The English-Speaking Nations*, Chap. XIII.

them. This decision brought civil war nearer, for its effect was to make slavery a national instead of a local institution. It only required the raid of the brave, simple-minded anti-slavery leader, John Brown, on the arsenal at Harper's Ferry in Virginia, to fan the spark to a flame. Brown was hanged as a traitor, but he was many times avenged. The first blow of the war that was to follow was struck at Charlestown, and the capture of Charlestown by the Federals was almost its closing incident. But not even the hoisting of the Federal flag over Fort Sumpter was as dramatic an incident as the entry into Charlestown of free and victorious negro troops singing the famous song with the refrain,

> 'John Brown's body lies a-mouldering in the grave,
> But his soul goes marching on'.

The two political parties were the Republicans (who opposed slavery) and the Democrats (who supported it). The Republicans nominated as their candidate for the Presidency Abraham Lincoln (familiar to modern readers through Mr. Drinkwater's play), a man of sincerity and simplicity, of mercy and forgiveness, of inflexible courage and resolution, imperturbable, incorruptible, and endowed with almost superhuman patience and power to read the inner minds of men. Lincoln hated slavery and determined to prevent its extension, but he was prepared to protect it where it existed, though in nowise to allow it to be taken into free territory. This was not enough for the South. South Carolina and six other Southern States at once seceded from the Union and constituted themselves the 'Confederate States' under the presidency of Jefferson Davis. Thus the struggle became not only one for or against slavery: the North, known as the Federals, were fighting also to preserve the Union, to prevent the destruction of a nation. Lincoln was sworn to maintain the constitution. His law officers advised that there was, in this constitution, no liberty of secession. When the seven states seceded he, as President, was bound to fight or render himself liable to impeachment for failing to use the means in his hands for the maintenance of union, and his oath. But though it must be admitted that many a Northerner opposed

slavery less because he loved the slave than because he hated the slave's master, the slavery issue was never lost sight of, and in Julia Ward Howe's *Battle Hymn of the Republic*, waved like a banner before the Northern armies all through the war ;

> ' In the beauty of the lilies Christ was born, across the sea,
> With a glory in His bosom that transfigures you and me :
> As He died to make men holy, let us die to make men free !
> While God is marching on '.

This is not the place to narrate the history of the war. The defeat of the Northern troops at Bull Run [1] in North Virginia by the Confederates under Generals Beauregard and ' Stonewall ' Jackson showed them what sort of a struggle they were in for, and impelled Congress to vote 500,000,000 dollars and 500,000 men. The sympathies of Lancashire, notwithstanding the fact that her commercial interest lay in the contrary direction, never wavered from the side which opposed slavery, but Palmerston and most people in England believed the South would win, and until the battle of Gettysburg (1863) this seemed probable. England at once and quite rightly recognised the South as belligerents, that is, acknowledged that they were not mere rebels, as the North called them, and, six weeks later, the North followed suit in according them similar recognition. But England was less right when she allowed cruisers, like the *Florida* and the *Alabama*, to be built in Birkenhead and Mersey dockyards, avowedly for use as privateers by the Confederate Government. The *Alabama*, under the once famous Captain Semmes, had a successful career which lasted for two years, till she was sunk off Cherbourg by the Federal cruiser *Kearsarge*. Britain later atoned for her fault by the payment, on arbitration, of a heavy indemnity (the cancelled cheque for 15,000,000 dollars hangs framed in the Foreign Office). But the feeling of hostility aroused lived long, and was echoed in 1915, when, a few weeks before the sinking of the *Lusitania*, a German merchantman of the Hamburg-American Line, the *Dacia*, which since the outbreak of war the previous year had lain interned, like other

[1] 21st July, 1861.

German vessels, in an American port, was purchased by an American citizen, and announced to be sailing to Germany with a cargo of cotton. The British Government said that if the *Dacia* sailed they would be bound to seize her. Memories of *Alabama* days were revived, and across the water feelings ran high. Happily a crisis was averted by the suggestion of the American ambassador, Walter Hynes Page. Page had lived through the American Civil War and remembered, as a little boy of ten, seeing Sherman's victorious troops file past his home to compel the surrender of the last Confederate army at Durham, fifteen miles further on. His suggestion was that the *Dacia* should be seized by a French and not by a British cruiser,[1] and the threatened crisis was averted. Meanwhile the American Civil War and the *Alabama's* successful depredations were proceeding. The cotton port of New Orleans was captured by the Federals in 1862, but the Southerners managed to burn the vast quantities of cotton stored there when the Northerners came in sight. At the outset of the war, Jefferson Davis had issued commissions to privateers to attack the Federal commerce, and President Lincoln responded by blockading the Southern ports. Iron-clad vessels had just been adopted (1860) by the British and French Navies, and the Confederates, in 1862, fitted out the frigate *Merrimac*, 5000 tons, as an ironclad. On 8th March she put half the Federal fleet out of action in Hampton Roads, and would have dealt with the other half next day. But that evening the Federal fleet was joined by a queer little craft of 900 tons, invented by Captain Ericsson, a Swedish engineer. With her revolving turret, containing two heavy guns, she looked like 'a cheese-box on a raft'. She was called the *Monitor*, and has given her name to all later ships belonging to her class. After a fight of two hours the *Merrimac* drew off, beaten. The victory was important: it made the Federal blockade effective, and prevented not only the importation of further supplies by the South, but also the exportation of cotton to Lancashire.

[1] Burton J. Hendrick: *Life and Letters of Walter H. Page*, i. 394 *seq.* Cotton was not made contraband of war till August, 1915.

THE ENGAGEMENT BETWEEN THE *MERRIMAC* AND THE *MONITOR*

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On New Year's Day, 1863, Lincoln turned the war into a life-and-death struggle by declaring the freedom of all the slaves in the Southern States. At the close of this year Lee crossed the Potomac and invaded Pennsylvania, to be met by Meade at Gettysburg—the ' battle that made a nation '. This victory not only saved the North from invasion, but made its ultimate victory a foregone conclusion. Next year Ulysses Grant assumed the supreme command of the Northern armies, and attacked Lee in Virginia. Slowly Lee's armies were worn down, and the last stroke was Sherman's famous ' March to the Sea ', which cut off the Confederates from their supplies, and finally broke up their railway system. In December he captured Savannah, and presented to Lincoln, ' as a Christmas gift to the nation ', 150 heavy guns and 25,000 bales of cotton. On 9th April, 1865, Lee, the beloved ' Uncle Robert ' of all the men he had commanded, laid down his arms. He received the honourable terms he deserved, and carried into retirement the esteem of the civilised world. Five days later Lincoln was assassinated. *Mr. Punch*, whose judgment is not often in error, but who had failed, in Lincoln's lifetime, to recognise the most heroic figure of the nineteenth century, made atonement after his assassination :

' So he grew up, a destined work to do,
And lived to do it : four long suffering years'
Ill-fate, ill-feeling, ill-report lived through,
And then he heard the hisses change to cheers,

The taunts to tribute, the abuse to praise,
And took both with the same unwavering mood :
Till, as he came on light from darkling days,
And seemed to touch the goal from where he stood,

A felon hand, between the goal and him,
Reached from behind his back, a trigger prest—
And those perplexed and patient eyes were dim,
Those gaunt, long-labouring limbs were laid to rest. . . .

The Old World and the New, from sea to sea,
Utter one voice of sympathy and shame !
Sore heart, so stopped when it at last beat high,
Sad life, cut short just as its triumph came '.

On the eve of the war (1860) the cotton trade in Lancashire was very prosperous. Wages were at the highest point they had ever touched. The profits amounted in some instances to 30 and even 40 per cent. on the capital engaged. Few Englishmen thought the Americans would fight, and those who did generally believed the South would still be very glad to go on selling her cotton. Even when the war began—July, 1861—Lancashire, knowing that four months' supply of American cotton was still in hand, and that supplies from other sources would go on as usual, was not alarmed. No one thought the war would last long. The scale of prices is a delicate and reliable barometer, and during most of the year there was no remarkable rise and the market remained 'dull'.

By October, however, mills began to run short-time. The North had declared a blockade of the Southern ports, partly to prevent the South from getting military supplies and partly to force England to side with her. For all Americans believed that over here 'cotton was king', and the North argued that, if they held up cotton, they could control England. As the winter advanced short-time changed to unemployment. Speculators held up such supplies of cotton as remained till the price should rise, and the blockade inflated the rates of insurance. By January, 1862, those seeking poor relief were 70 per cent. above the number twelve months before, and this figure does not tell the whole tale, for the more proud and provident of the work-people were supporting themselves on their own savings, and out of the loan funds of their co-operative societies and savings banks.

The pressure did not, of course, fall equally. Where only a small proportion of the population were dependent on cotton, as in Warrington, The Fylde, Garstang, Saddleworth, and Skipton, distress was only slight. Bolton was a comparatively slight sufferer from a different cause. Though in 1540 Leland had been able to say of her that she 'stondeth most by cotton and coarse yorn', and though Richard Bloome in 1673, and Daniel Defoe in 1725, recorded her prowess in the manufacture of coarse fustians,

by 1860 she was engaged in the 'fine counts' trade that almost exclusively occupies her 120 mills and 8,000,000 spindles to-day, and was showing that preference for Egyptian cotton which now connects her so closely with the Nile valley. In the production of fine goods not only is less cotton required, but the cost of raw material is small in relation to the cost of labour. Therefore, though then almost wholly dependent on the cotton trade, Bolton suffered much less than, for example, Rochdale, which, although it was partly saved by its woollen industry, was a voracious devourer of raw American cotton for its coarse spinning and fustian weaving. In Oldham pauperism was, in May, 1862, 100 per cent. above what it had been twelve months before. Yet Oldham was more fortunate than many towns. The average pauperism over the twenty-eight unions in the cotton districts at that time was 130 per cent. in excess of 1861. In Blackburn no less than twenty-two new mills were in course of erection in 1860. Wages had risen from 5 to 15 per cent. The countryside was scoured for more workers, and many families came even from the South, though it was difficult to find a cottage to live in. Pauperism in Blackburn had reached its minimum in 1861. Suddenly all was changed. In May, 1862, Mr. Commissioner Farnall reported: 'The increase of pauperism over May, 1861, is 500 per cent. made up mainly of mill-hands out of work. . . . The number totally out of work in the township alone is 8,424, whilst as many more are working short-time, leaving only 9,113 out of 25,975 in full work. One-third of the operatives are wholly without the means of living, and another third are on half-rations'. By November 31.8 per cent. of the population was in receipt of relief from the Guardians or Relief Committees. At that date the numbers in receipt of relief in Preston were eleven times what they had been twelve months before (47.5 per cent. of the population, as against 4.3 per cent). The people of Preston had shown in 1856 that they knew how to suffer, when they inflicted six months' starvation on themselves by a strike, and they took the present crisis in the same spirit: 'Aw guess it'll not last for ever', said one sufferer: 'We keepen a daycent

eawtside', smiled another. Some mills, like 'Th' Big-un' (Messrs. Swainson and Birley's) were still running, and the Board of Guardians were active in promoting useful work. As one approaches Preston from the South, and beholds the beautiful walks and gardens, flanked by the great railway bridges over the Ribble, with the Park Hotel and the houses of East Cliff looking down on them, one realises to what good purpose the Preston

MESSRS. SWAINSON AND BIRLEY'S MILLS
From an engraving of 1834

victims of the cotton famine devoted their enforced idleness. Stockport had suffered more than most places in the Chartist days, so that some wag had been moved, by the sight of the many empty cottages, to chalk on a shutter, 'Stockport to let'. Twenty years later it had a population of 54,000, of whom one-third, or 17,000, worked in the cotton mills. In June, 1862, more than 6,000 of these were wholly idle, and just under 6,000 on short time, and the numbers dependent on the Guardians 226 per cent. in excess of the number in 1861.

One might have expected things to have been better in Wigan, which had its collieries as well as its mills, and where only 19 per

cent. of the population were dependent upon the cotton manufacture. But so exclusively was Wigan coal used for the cotton mills that now stood idle, that Wigan was little better off than other cotton towns. In 1861 the withdrawals by the working classes and small shopkeepers from the savings bank were £2,000 in excess of the deposits. In 1862 the deposits ceased altogether, and by May only one mill was working full time. The lot of the mines was little better than that of the factories. The *Manchester Examiner and Times* for 2nd September, 1862, reports an interview with a throstle overlooker in Amy Lane, who had been nine months out of work. 'There's five on us here', he said, 'when we're o' i' th' heawse. When th' work fell off I had a bit o' brass save't up, so we were forced to start o' usin' that. But month after month went by, and th' brass kept gettin' less, do what we would; an' th' times geet wur, till at last we find ersels fair stagged up. At after that, my mother helped us as weel as hoo could—why, hoo does neaw, for th' matter o' that, an' then aw've three brothers, colliers; they've done their best to poo us through. But they're nobbut wortchin' four days a week neaw. . . . Aw go a-fishin' a bit, neaw an' then; an' aw cotter abeawt wi' first one thing an' then another, but it comes to no sense. It's noan like gradely work. It makes me maunder up an' deawn, sometimes like a gonnor wi' a nail in it yed. Aw wish to God yon chaps in Amerikay would play th' upstroke, an' get done wi their bother, so as folk could start o' wortchin' again'.

There was not a man or woman in Glossop who did not endorse this wish of the Wigan throstle-overlooker that 'yon chaps in Amerikay would play th' upstroke'. In the twelve months between November, 1861, and November, 1862, Glossop's percentage of population receiving relief had risen from 1.04 to 35.9. Indeed only in one union, that of Ashton-under-Lyne, was the effect of the famine more severe than at Glossop. There in the thirteen townships comprising the Union, 32,881 persons out of a population of 134,761, were, as early as May, 1862, receiving relief; while in the township of Ashton-under-Lyne the figures were 19,386 receiving relief out of a population of 66,806. This

is 30 per cent.; 'and', reported Mr. Commissioner Farnall, 'I am obliged to add that the poverty of the township is still increasing'. The Commissioner ended his report of May, 1862, thus: 'The situation of Ashton-under-Lyne illustrates that of such places as Preston, Blackburn, Stockport, and other similar localities; and perhaps I may be permitted, even in this official communication, to assure those benevolent persons in England and the Colonies who are now charitably aiding the Lancashire workpeople, that their subscriptions are saving thousands of meritorious operatives and their children, whose spirits are yet unbroken, from the necessity of applying for parochial relief, and are, at the same time, attaching to themselves a class of people whose present conduct is a guarantee of their sterling goodness'.

A month before this (April 14, 1862) there had begun appearing in *The Times* letters over the signature 'A Lancashire Lad,' written by John Whittaker of Wigan. The cotton workers had been compelled to accept relief from the poor rates, and many, rather than accept help in that shape, sought a livelihood singing in the streets. They hated the task, and were singularly shamefaced about it. Their favourite tunes were those of their own neighbour Leech. Others, from Stockport and elsewhere, were reduced to begging, but this distasteful task was left mostly to the women. 'Mon', they would say, 'it's a nasty, dirty job; aw'd as soon clem'. 'One doesn'a like to go a-beggin' among folk at they known'. These women were new to begging, but novelty failed to lend it charm. 'Aw never did sich a thing i' my life afore—never! But it's th' first time and th' last for me—it is that. Aw'll go whoam, an' aw'll dee theer, afore aw'll go a-beggin' ony moor'. But as soon as 'The Lancashire Lad' made the readers of *The Times* aware 'our factory women and girls were plodding their weary way from door to door and begging a bit of bread', the country's sense of justice stepped in, and the Mansion House Fund was opened—fortunately before the distress had reached its worst point. Cobden rightly prophesied that not less than a million would be required to carry Lancashire

through the crisis.[1] Suffering there was in plenty for two full years to come. But the proud folk of Lancashire had no need again to sing or beg in the streets.

Subscriptions poured in from far and wide. One of the first was from Cheltenham, whose Rector [2] had formerly been Vicar of St. Jude's, Manchester. Two of the most striking were from Rouen, whose own cotton workers were suffering from a famine in raw cotton like their Lancashire brothers and sisters, and from the Northern States, who, engaged as they were in a life-and-death struggle, yet found it in their hearts to remember the workers across the ocean whom their quarrel was injuring. India and the Colonies now as always were generous to the Mother Land, and their contributions alone amounted to nearly £160,000. Every country in Europe sent money, France sending nearly £4,000. In these islands there was not a county or a town of any size that did not contribute. But the Fund received a great many individual subscriptions, showing how universal was the sympathy felt. The first act of the Prince of Wales on attaining his majority was to write from Rome sending £1,000, while Lord Shaftesbury sent contributions from his brigade of shoe-black boys. Other typical specimens of contributors were 'A Child's Money Box', 'Long Tom the Carrier', 'A Little Girl', 'A Police Sergeant', 'A Lady's Maid', 'A Little Boy at St. Andrews—half his whole savings', 'Susan and Jane, helped by Miss Mary', 'A Factory Boy and Girl', 'Forty Little Boys (saved from pleasures usual on 5th November)', 'Schoolboys, Scholes, Cleckheaton', 'Compromise for an Offence against the Game Laws', 'A Lancashire Lad in Egypt'. It was urged by some that Lancashire itself had been backward in generosity. But by January, 1863, in Manchester and Salford alone £130,000 had been subscribed, and the testimony of those who collected was that never were donations so freely and generally given, and that, far from being refused, they found themselves thanked for asking and encouraged to persevere. But, as Lord Derby

[1] John Watts, *The Facts of the Cotton Famine*, p. 173.
[2] The Rev. E. Walker.

pointed out at the meeting of the County magnates at Lancaster on 2nd December, 1862, the amount of public contributions gave no fair indication of what had really been done in the county. Many mill-owners were acting behind the scenes with princely munificence. The mill-owners were usually the cottage owners, and no rents were asked for.[1] 'Mr. A. at his own cost, employed 555 girls in sewing five days a week, paying them 8d. a day; sent 76 youths and 332 adults five days a week to school, paying them from 4d. to 8d. a day according to age, and paid the school pence of the children'. Mr. B. had paid, while his mills were idle, two days' wages a week, giving at the same time bread, soup, socks and clogs, and was going to pay more. Messrs. C. were giving three days' wages a week—a weekly expenditure of £500. Messrs. D. provided all their hands with sufficient clothing and bedding to supply every want, 'so their subscription of £50', explained Lord Derby, 'is merely nominal'. In one small town, with one mill, the Central Committee refused help, as there was no local subscription. Inquiry showed that since the mill had closed, nine months before, the owners, two young men just started in business, had maintained the whole of their hands, that they paid the whole of the rates of the district, and that they were suffering an annual loss of £300 for the rents of their cottages for which they were not drawing a single halfpenny. In a return made early in 1865 it was reported that at Shuttleworth a manufacturer 'employing some 800 persons, had paid wages to his hands during the whole period of the distress, and not allowed one of them to go either to the Guardians or the Relief Committee'.

But although the large public relief fund was organized in order to save the victims of the Cotton Famine from having to submit

[1] By 1865 the arrears in rent in Glossop were estimated at £20,000; at Mossley they were £8,147; at Dukinfield, £5,115; at Marple, £1,200. At Burnley there were no voluntary remissions, but rent was seldom demanded; similarly at Colne, Whitefield, Rochdale, and many more there was no formal remission, but the rule was not to ask for rent during the distress.

to the labour-test of the Poor-law Guardians, it was felt that it was necessary for the Relief Committees to have a test of some kind. At a meeting of operatives held in June, 1862, in Stevenson Square, Manchester, Thomas Evans came into notice by proposing a resolution for the immediate formation of Relief Committees 'for the purpose of finding out those really deserving cases who are silently suffering the pangs of hunger'. The meeting sent him on a deputation to the guardians, and there he solved the problem of the test by asking, 'Why not adopt an educational test'?[1] The result was that elementary schools were soon established all over the cotton district. In the schools might be seen fathers and sons, and sometimes grandfathers too, all learning to read and write in the same class. In the winter of 1862-3 the number of men and boys in attendance rose to 48,000. Great efforts were made to ensure that the work should be interesting. Assistants to the teachers appointed were found from the operatives themselves in the ratio of one to fifteen. Lectures and concerts were also provided. Ladies—Mrs. Gaskell, the novelist, among them—freely gave their services to teach the classes for girls and women, who learnt to sew and to cook as well as to read—there were 41,000 in the sewing classes alone in March, 1863. Sir James Kay-Shuttleworth, the vice-chairman of the central executive, was well fitted to guide the scheme. As a Poor Law Commissioner he had put better education in the forefront of poor law reform, and when in 1839 a committee of the Privy Council was established "to superintend the application of any sums voted by Parliament for the purpose of promoting Public Education" (the committee that has developed into the Board of Education), he had been chosen to be its first secretary.

[1] It was a wise suggestion. The Board of Trade statistician, G. R. Porter, had found that 40 per cent. of the men and 65 per cent. of women married or witnessing marriages in Lancashire and Cheshire in 1841 could not sign their names; and that, in an area of 32 square miles, with a population of 105,000, comprising Oldham and Ashton, there was not one public day-school for poor children. (Cf. Porter's *Progress of the Nation*).

Meanwhile in America the war showed no sign of abating.

> 'To happy ports
> no longer do their wonted armaments
> spread wide the silver of their sails from far:
> hushed half our factories, and half our folk
> cold in the cheerless highways want for bread'.[1]

The Confederate Government saw their opportunity and set up

Blockade Runners loading Cotton at Nassau

a 'Cotton Loan', borrowing money from the manufacturers of Lancashire, and making it payable in cotton at 5d. per pound. This practice was called 'Running the Blockade'; and by its means 71,750 bales of American cotton were brought to Lancashire in 1862, and 131,900 bales in 1863. It was risky work: the Federal men-of-war grew more efficient and more numerous as time went on, and mercy was not to be expected. But the profits were enormous. The boats that most distinguished themselves in this blockade-running were the Clyde steamers.

[1] F. W. H. Myers, *Distress in Lancashire*—the poem which won the Chancellor's Medal at Cambridge in 1863.

The Clyde had been the cradle of steamship enterprise, and her passenger-steamers the pioneers of development both in build of hull and in machinery. As long ago as 1803 Henry Bell of Helensburgh had laid the advantages of steam propulsion before the Lords of the Admiralty. The genius of Nelson saw the point: 'My Lords, if you do not adopt Mr. Bell's scheme, other nations will, and in the end vex every vein of this empire. It will succeed, and you should encourage Mr. Bell'. But the Admiralty did not encourage Mr. Bell, and the United States took up his idea. However, in 1812, he launched the little *Comet* on the Clyde, and the Clyde paddle steamers, as well as the other vessels that ran the blockade, were the *Comet's* lineal descendants. The names of some of these gallant little ships, that were not daunted either by Atlantic rollers or Federal guns, are worth recording—*Eagle, Gem, Vesper No.* 2, *Ruby No.* 3, *Neptune, Rothesay Castle No.* 3, *Alliance, Pearl, Kelpie, Jupiter. Jupiter* had an unusually successful career. *Rothesay Castle* survived the blockade, was re-named *Southern Belle,* and for many years served on the Canadian Lakes. But all were not so fortunate. *Iona No.* 1 was run down and sunk as she was crossing Gourock Bay without lights. *Iona No.* 2 went down in the Bristol Channel. *Vesper No.* 2 was lost off Lambay Island.

All possible economy was, of course, exercised in the use of material. The cotton waste trade was practically born during the hard times of the American Civil War, and there was no lack of effort on the part of the manufacturers to obtain raw cotton from other sources than the Southern States, but it was an uphill task. Mr. Thomas Clegg, visiting Tunis, Algeria, and Egypt, had not found one of the gins sent out by the new Cotton Supply Association in working order. Delay and blunders marred the efforts that were made in India, where steps were taken to develop the growing of cotton in the Southern Mahratta country. By the middle of 1862, 724 cotton gins and much other machinery had been sent out, enough, it was estimated, to clean 1400 bales of cotton a week. But the promised road at Kyga Ghat, from Dharwar to Sedashegur was

not fit for use: it had been made, twelve feet wide, but so ineffectively that the monsoon rains washed it away. Nor was the promised pier at Sedashegur constructed, and there were no wharves at Bombay. When cotton had to be carried a thousand miles to port by bullocks, and then put on board ship by means of boats, much of the original crop was likely to perish by the wayside. Turkey, on the other hand, after the outbreak of the American War, abolished for five years all taxes on cotton-growing land, and set apart funds for the construction of roads. In Egypt the area under cultivation was greatly extended. Strenuous efforts to increase the output were made in Italy, Sardinia, Elba, and even Piedmont. Whatever these efforts amounted to, they enabled those who were annoyed at the delays in India to say, 'Lord Russell (Foreign Secretary) aids the cultivation of cotton in every suitable foreign country; Sir Charles Wood (Secretary of State for India) hinders it in our chief dependency'.[1] There were other difficulties. We had been used to pay America with manufactured goods for her cotton, but India demanded gold and silver. The 'Surat' cotton was, moreover, difficult to work. Much of the machinery was not adapted for it, and to use it required extremely hard toil. Before the feeling against it had arisen, and when Surat was beginning to come in, a Stalybridge brewing firm sought to be up-to-date by advertising their ale as 'Surat Ale': soon they found themselves well-nigh ruined, for no one would drink it. Samuel Laycock, 'the Laureate of the Cotton Famine', expressed the popular views in his 'Surat Weavers' Song':

'Oh dear! iv yon' Yankees could only just see
Heaw they're clemmin' an' starvin' poor wayvers like me,
Aw think they'd soon settle ther' bother an' strive
For 't send us some cotton, to keep us alive. . . .

Aw wish aw wur far enough off, eawt o' th' road,
For o' weivin this rubbitch aw'm gettin' right stowed,
Aw've nowt i' this world to lie down on but straw,
For aw've only eight shillin' this fortnit to draw'.

[1] John Watts, *The Facts of the Cotton Famine*, 1866, p. 446.

The final result of India's efforts to respond to Lancashire's need of raw cotton during the American Civil War was the establishment of the cotton mills of Bombay. For as soon as the war was over Lancashire went back to the American market, and India, finding her cotton left on her hands, was driven to discover a use to which to put it.

In 1863 there were 750 empty houses and shops in Stalybridge alone.[1] The number of bankruptcies registered in the Court at Manchester was 261. It had been 370 the previous year, but the decrease was fallacious: in 1864 the number was 387. In October of that year peace rumours came and unsettled prices. Trade, after three and a-half years of war, had accustomed itself to war prices. When the first rumour (a false one, as it proved to be) of peace came over the ocean men looked blankly into each other's faces. Middling Orleans fell from thirty-one pence to twenty-three pence halfpenny. The workers on full time were reduced by 144,000, and those on short time increased by 66,000.[2] The news of the fall of Richmond, the Southern capital, renewed the panic, but not seriously. The rebound of prices was not long delayed, and when peace came employment increased so regularly and rapidly, that after June, 1865, the central executive of the Relief Committee were able to discontinue their meetings. The general committee met for the last time in December. By that time those receiving parochial relief were only 730 in excess of the numbers at the same date in 1861, when the stoppage of work had barely begun. Wigan was more heavily burdened than at that time, and in Bury and Chorlton-upon-Medlock distress lingered. But in Ashton, Blackburn, Glossop, Preston, and Stockport the numbers were actually lower than in 1861, and the Guardians felt that 'the cotton famine had come and gone'. The report of Mr. J. W. Maclure, the honorary secretary to the Committee, showed that there had, in the 28 Unions, been a constant diminution of the numbers relieved since 1862, when they reached 458,441. The next year they were

[1] Samuel Hill, *Bygone Stalybridge*, p. 88.

[2] John Watts, *The Facts of the Cotton Famine*, p. 224.

SEWRI COTTON DEPOT, BOMBAY
Note the pile of cotton in the centre of foreground

170,268. In 1864 they were 149,923, and in 1865 they had fallen to 48,267. In 1861 they had been 47,537. The Committee had other things on which to congratulate themselves. 'There has actually', Mr. Maclure's report stated, 'been a diminution of crime under circumstances when, from compulsory idleness and poverty, an increase might have been expected. Notwithstanding the gloomy forebodings of those who, in the early part of the distress, expressed their opinion that the distribution of relief through exceptional channels would tend to a permanent increase of pauperism in the district, returns from the 28 Unions prove that the pauperism of the cotton district has been reduced to the ordinary level'. Lord Derby, Chairman of the Committee, spoke but the bare truth when he added, 'there has been an infinitely less amount of demoralisation and deterioration in the independent character of the working men of the county than could have been possibly expected'; [1] and his words justify Mr. Commissioner Farnall's report in May, 1862, (see p. 231 above) on the operatives at Ashton-under-Lyne and at Preston, Blackburn, Stockport, and similar places, 'whose spirits are yet unbroken . . . and whose present conduct is a guarantee of their sterling goodness'.

But if the long stoppage of work and consequent suffering passed away like an evil dream, and the scars, such as the loss of the workers' savings, and the postponement of marriages, were forgotten in the joy of welcoming the return of the cotton-laden waggons, there were permanent lessons from the four years which it is important to remember. Not only would the suffering have been far greater had not other industries, and in particular the woollen industry, boomed during the same time,[2] but one inherent weakness of our present industrial system was thrown into startling relief. As civilization advances the industries of the temperate zones depend more and more on the tropics for their raw material, be it cotton, rubber or cocoa. The cotton famine in Lancashire was caused by the temporary

[1] John Watts, *The Facts of the Cotton Famine*, pp. 449-452.
[2] *Ibid.* Chapter XXI.

closure, through a war in which we were not concerned, of one of the tropical sources of raw material. The conclusion that it was desirable to widen the field from which the raw material of the cotton industry was drawn was obvious, and has not been lost sight of. In the first year of the present century the Oldham Chamber of Commerce appointed a committee to make inquiries into the possibility of promoting the growth of cotton in the British Empire. Out of this grew the British Cotton Growing Association (1902), which brought about a more scientific study of cotton in Egypt and India, and cleared the ground by ascertaining many of the areas where, for one reason or another, cotton cannot profitably be grown ; and in 1917 was appointed the Empire Cotton Growing Committee, which issued its report in 1920.[1] But a famine of the raw material of one of our great industries might arise from a war in which we are concerned, that is, not from the locking up of the raw material, but from inability to import it. This is a matter of sea power, upon which the very life of an island like Great Britain unceasingly depends. It should never be forgotten that the Lancashire cotton industry depends, far more than upon any one source of supply, upon the British Navy. For the trade of every country is based upon its system of communications, and the system of communications, not only of Britain but of the whole British Commonwealth, is the Seven Seas.

[1] Cmd. 523.

X

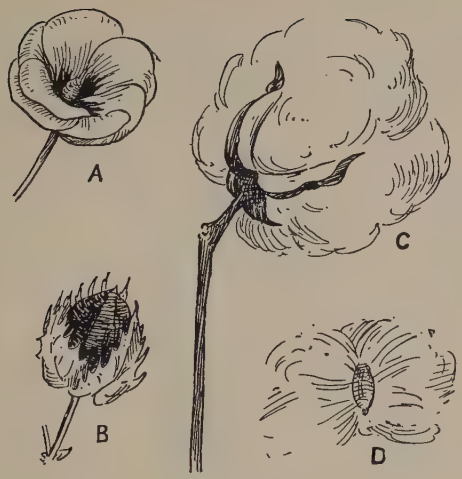
THE SUPPLY OF RAW COTTON

The great cotton manufacturing province of Manchester and district depends entirely upon 'overseas' for the large quantity of raw cotton which it needs; none can be grown in this country. Cotton is a vegetable fibre, and 'raw cotton' consists of the long fibres or tubes which cover the seeds of the plant. These fibres are really elongated single plant cells varying in length in different species, and under different conditions of growth, from about $\frac{3}{4}$ of an inch to over 2 inches. The fibres are attached to the seed at its base, and develop as it ripens. After the flower has gone, what is called a 'boll' of these fibres is formed—a sort of round, fluffy ball about $1\frac{1}{2}$ to $2\frac{1}{2}$ inches in diameter. As the boll ripens it bursts and expands, and the fluffy mass of white fibres is exposed. The sight of a field of ripe cotton is one not easily forgotten. Henry Timrod has depicted it for us:

'And lo!
To the remotest point of sight,
Although I gaze upon no waste of snow,
The endless field is white;
And the noble landscape glows,
For many a shining league away,
With such accumulated light
As Polar lands would flash beneath a tropic day'!

When the boll is quite ripe the mass of 'cotton wool' is picked off and taken to the ginneries to be freed from the seed, cleaned, packed, and exported.

The cotton shrub belongs to the genus Gossypium, of the order Malvaceae or mallow family. A well-known British flowering plant belonging to this order is the hollyhock which is, in many respects, somewhat similar to the cotton plant. Botanists differ



COTTON

A, flower; *B*, boll; *C*, open boll; *D*, seed, with cotton attached

COTTON GINNING

in their estimates of the number of species, but three or four are almost universally recognised. The plants of the different species and varieties vary considerably in height, build, and habit, but generally they are bushy plants from three to six feet high. The flowers vary from the creamy white of the American Upland shrub, through the canary yellow of the Sea Island species and the golden yellow of the Egyptian, to the red of the sacred cotton tree of India.

The cotton plant grows only in the tropical and sub-tropical regions, from approximately 40 degrees North latitude to about 30 degrees South latitude. In explanation of the more northern extension we may be reminded that the heat equator runs a few degrees north of the astronomical equator, that is, the northern sub-tropical regions are slightly warmer than the southern ones in corresponding latitudes. All the species and varieties require for their growth a long summer—*free from frost.* The latter condition is most important, for the plant is peculiarly sensitive to frost. The best types seem to be produced where the temperature is warm but not excessively hot, especially during the period of most vigorous growth, and, above all, there must be long continued, bright sunshine. A moderate but not excessive amount of moisture is necessary, and this may be supplied by either natural rainfall or by irrigation. It will appear from the above that the hot, wet, equatorial lowlands, with rain almost all the year round, do not offer the best conditions for the growth of good cotton; the plant does better in the lighter tropical forest lands and in the savanna lands where there is a seasonal rainfall and several months with plenty of sunshine. The oases and alluvial valleys of tropical desert regions produce cotton of excellent quality, provided water can be supplied regularly by schemes of irrigation well arranged and well managed. The best cotton of all is that known as Sea Island, which is derived from the plant, Gossypium barbadense; this has the longest, finest, and strongest fibres in the boll. In this species the length of the fibre (the staple as it is called) occasionally reaches as much as $2\frac{1}{4}$ inches, with an average in fair samples of 1·65 inches. The mean length of staple

for different representative varieties is given in *The Textile Manufacturer Year Book* for 1924 as follows: Sea Island, 1·65 ins.; Egyptian, 1·50 ins.; Pernambuco, 1·25 ins.; American, 1·10 ins.; Indian, 0·90 ins.

INDIANS WEAVING

Cotton was grown, spun, and woven in India as early as 500 B.C.; and in Egypt its use was certainly known before the Christian Era. It was in India that the early manufacture had reached the highest stage of perfection, and it was probably

from that region that the art of spinning and weaving gradually spread into the Nearer East and then into Europe. The Arabs brought it into Spain in the eighth or ninth century, and the Arabic name *qutun* or *kutun* was probably introduced at that time.[1] The Moorish towns of Southern Spain (Cordova, Seville, and Granada), as has been stated, developed a considerable manufacture in those early centuries. Italy had learnt its use in the thirteenth century, and that knowledge gradually spread from there to the Hansa towns of the European Plain, and especially to the textile towns of the Netherlands. Protestant refugees from Holland (Flemings) introduced it into England at the end of the sixteenth and the beginning of the seventeenth centuries. In 1640 we read of Manchester cotton buyers in the Levant, and the best 'vegetable wool' of the period came from Smyrna and Cyprus (see p. 40). The extension of British rule in India brought Indian cotton goods more into notice in this country, and such names as Calico (from Calicut) and Muslin (from Mosul) are reminders of the trade of those early days. The natives of India, by the exercise of great patience and by skill acquired through long practice, made cotton goods of great excellence and beauty; the early English cottons were only very inferior imitations of the Indian cloths.

It has already been mentioned that in 1736 Parliament allowed the sale and use of cloth *made in Great Britain* only from linen or woollen or silk warp and 'cotton wool' weft; and that this restriction lasted till 1774. Henceforward the demand for cotton exceeded the supply, and it was not long before the systematic production of the fibre was taken up in earnest in many regions. The first consignment of raw cotton from the United States came to the firm of Wm. Rathbone & Sons of Liverpool in the eighties of that century, and consisted of eight bales and three barrels. Eli Whitney invented the cotton gin, a machine for separating the fibre from the seed, in 1793; this gave a great stimulus to the cultivation of cotton in the United States, and that country rapidly became the most important source of the

[1] See p. 26.

world's raw cotton. It is easy to see why Liverpool grew to be the greatest cotton port (*for import*) in the world ; the combination of its hinterland of East Lancashire as the great manufacturing region, with the United States as the chief source of supply, was Liverpool's opportunity, and these formed a commercial chain of three very strong links.

In the early years of the great development of the cotton manufacture, the West Indies supplied a considerable share of the raw cotton. In 1790 the Southern United States exported only about 300 bales of 500 lbs. each, but by 1800 this small quantity had been multiplied by 120 and stood at 36,000 bales.[1] The Liverpool Philosophical Society was interesting itself in the demand for a larger supply of raw cotton, and the vast areas in the United States, still unknown and unexplored, attracted its attention. The Society's corresponding secretary was John Bradbury (1765-1825) of Stalybridge, who, like Livingstone, as a boy had studied mathematics and botany while working at his machine. In 1809 Bradbury was sent out with letters of introduction to James Madison, President of the United States, and received a cordial welcome. His exploits are recorded in his book, " Travels in the interior of America in the years 1809, 1810 and 1811, including a description of Upper Louisiana, together with the States of Ohio, Indiana and Tennessee ".[2] The production of raw cotton in the United States of America grew by leaps and bounds during the nineteenth century and after, until in the year 1912 it reached the stupendous figure of over 16,000,000 bales. Since that year there has been, on the whole, a decline, and the 1924 figure stood at about 12,600,000 bales.[3]

[1] According to some authorities it was 42,000 bales, nearly all of it coming to Great Britain.

[2] Bradbury, disappointed at the scant recognition his services received in this country, returned to America and became the honoured curator of the Botanical Gardens of St. Louis. He died mysteriously on a visit to his old friends the Indians, and was buried by them in the valley at the head of the Red River. (Cf. Hill, *Bygone Stalybridge*, p. 204 *seq.*)

[3] The 1926 crop showed an increase again.

Some cotton was grown in Egypt in very ancient times ; but the cultivation on a great scale there is quite recent. A beginning had been made as early as 1821, but it was not until the shortage caused by the American Civil War in 1860-65 that Egypt really had its opportunity. The price of raw cotton rose tremendously, and Egypt increased the area under cotton very greatly ; further, when other emergency supplies rapidly fell away after the war, Egyptian cotton maintained its hold ; it had obviously come to stay. It filled a place which even good grade American cotton could not fill, and a great development of fine spinning has taken place in Britain, partly at any rate as the result of that temporary falling away of American supplies.

The reader may naturally ask, ' Why do we not obtain larger supplies from India ' ? As an answer it may be appropriate to quote what a former Chairman of the Council of the Empire Cotton Growing Corporation has written. ' The history of cotton in India is the history of a tragedy. India is one of the homes of cotton. In India were grown in early days cottons so fine that they have never been replaced. Yet in modern times Indian cotton has become a by-word of reproach. The cotton is generally only used for the lowest purpose, and hardly at all in this country. India has, of course, suffered correspondingly. America grows on 37,000,000 acres a cotton crop worth £150,000,000 for the lint alone, besides the value of the seed. India is said to have 24,000,000 acres in cotton, and the value is perhaps £40,000,000—35s. per acre as compared with £4 '. Thus wrote the late Mr. J. W. McConnel in the *Departmental Report for the Textile Trades* published by H.M. Stationery Office in 1918. And yet India is by far the most important cotton-growing area in the British Empire, and produces now about 5,000,000 bales per annum, or about one-fifth of the world's total crop. It must be borne in mind, however, that a great deal of the cotton now produced in India is too short in the fibre (or staple) to take the place of the best or even middling American, and that the British Cotton Manufacturing Region cannot use very large quantities of it in its high grade industry. Mr.

Thomas Crook of Burnley, a well-known authority on cotton supplies and cotton manufacture, tells an interesting story of the trying times during the American Civil War. Burnley had then, as now, some cotton spinning, and in common with other Lancashire towns was experiencing very bad times indeed. Many of the Burnley operative spinners were Nonconformists, and at a prayer meeting a good brother asked the Lord to send them more cotton. 'But not Surat, Lord, not Surat', ejaculated another brother who had strong feelings on the matter.[1]

The Indian Central Cotton Committee was constituted in 1921, its function being to advise the Government of India on cotton policy generally. A law was passed in India in 1923, which provides for a small levy on all cotton produced in India, whether exported or consumed at home. This Committee has already done good work in several directions, among which the following may be mentioned: preventing the fraudulent practice of mixing short with long-staple cotton; improving the cleanliness of the cotton exported; advising on seed selection so as to secure a larger quantity of long-staple cotton, which matures rather more slowly than the shorter staple varieties. The Indian and Imperial Governments have encouraged the increase of irrigation, and already ten million acres of irrigated land are under cotton in the Punjaub alone. One of the greatest schemes in the world is now in progress in the Indus region, to bring 750,000 acres into cultivation, and here it is hoped to grow, under the guidance of the British Cotton Growing Association, cotton with a staple of 1 to 1·2 inches.

The mills in India consume about half the output of that country, and as a rule the machinery has been adapted to short-staple cotton, that is, to cotton of coarser grades, and Indian cotton spinners naturally consider that the needs of Indian mills should not be overlooked. Here, then, is one of those delicate problems with which the British Empire has to deal in the immediate future. The two requirements do not seem to be in the

[1] Surat cotton was a well-known brand of Indian cotton. See page 237 on 'Surat ale'.

least incompatible; there is no reason whatever why India should not continue to produce all the coarser cotton needed in that great country, at the same time producing a much larger quantity of longer staple cotton suitable for use in Lancashire.

Let us now look briefly at the whole question of the cotton supplies of the world, especially in relation to Britain's greatest manufacturing industry. At the outset we must face the serious position that, whilst the demand for cotton goods is going up, the production of raw cotton has shown an alarming tendency to go down. At present the cotton spinners of the world would welcome an assured supply of at least 25,000,000 bales of 500 lbs. annually, and that quantity they could handle without undue strain, and without imposing too long working hours on their artisans. Of that 25,000,000 bales the spinners of Great Britain could deal with over 4,000,000 bales quite easily; with much less than that the British spindles and looms cannot be fully employed, and our greatest export industry at once suffers. Of the 4,000,000 bales which Britain needs about 3,000,000 bales or 75 per cent. would normally come from the United States at present, the rest from Egypt, India, Brazil, and various parts of the British Empire. In 1924 many of the mills in Britain were only partially employed, and the cotton consumed was 3,170,000 bales, in round numbers; of this, about 60 per cent. came from the United States, 22 per cent. from Egypt, and about 6 per cent. from India.

The production of raw cotton in the United States of America has declined, and there does not seem to be much hope of maintaining the 15 or 16 million bales per annum. At the same time the spinning and weaving mills of the United States are demanding more of their own raw cotton, and so there is likely to be less available for export. The cotton industry of Britain is thus faced with a serious problem; and it certainly seems dangerous to be dependent to such an overwhelming extent on any one supply of raw cotton, and especially one that is quite outside the control of the British Commonwealth. It is for these reasons that the British Cotton Growing Association

FIG. 12.—THE COTTON GROWING REGIONS OF THE WORLD
Map drawn on Lambert's Equal Area Projection

was formed more than twenty years ago, to see what could be done to stimulate the cultivation of cotton within the Empire.

Visitors to the great Empire Exhibition of 1924 saw in the entrance hall of the Cotton Section of the Palace of Industry bales of cotton from practically all the tropical and sub-tropical parts of the British Empire, that is to say, from almost all the dominions that have a suitable climate. There were represented North, South, and Central India; West, Central, and East Equatorial Africa; Rhodesia, South Africa, Australia, the East Indies, Iraq (Mesopotamia), Palestine, the West Indies, British Guiana, Cyprus, Mauritius, and the Fiji Islands—a really remarkable list, which is testimony to the propaganda and experimental work done in the Empire within the preceding twenty-five years or so. In 1900 very little cotton was grown in the Empire outside India and the West Indies. Writing in 1926, the amount produced within the Empire, apart from India, still seems deplorably small; it is probably not more than about 350,000 bales, that is, roughly, 1½ per cent. of the world's output. Still, a good beginning has been made, and it has shown abundantly that the Empire can, if it wishes, become quite self-supporting in the matter of raw cotton within about twenty years.

Some experiments that have been or are being tried within the Empire are worthy of mention here. The warmer parts of Australia, both in Queensland and Northern New South Wales, are suited to the growth of a good grade of cotton, but, of course, there is no native labour available. It is therefore being grown mainly on small farms as only one of their crops, the work being largely done by the farmer and his family without calling in hired labour.

In the Gezireh (or Island) region of Anglo-Egyptian Sudan, between the Blue and White Niles, which meet at Khartoum, a most interesting experiment is being tried under a scheme for which the late Lord Kitchener was largely responsible. There are three interested parties to be taken into account. The Sudan Government builds the railways, dams, main irrigation canals and roads; the experimental work, the ploughing, the seed

Cotton Plantation in the Callide Valley district, Queensland

Carrying the crop

distribution, ginning, and marketing are done by the Sudan Plantations Syndicate ; the native tenants do the actual cultivation and the picking of the ripe cotton. The gross proceeds are pooled and divided in a fixed ratio : 40 per cent. to the native, 35 per cent. to the Sudan Government, and 25 per cent. to the Syndicate. This plan is said to be working very well, and the native population is increasing. The cotton produced there is judged to be equal to the best Egyptian, and, now that the new barrage on the Blue Nile at Makwar, near Senaar, projected twenty-five years ago by Sir William Garstin, is completed, another half-million acres are being placed under cultivation. This great dam, formally opened on 21st January, 1926, was actually completed in the previous June. In the early summer the Blue or Muddy Nile—unlike its clear, sluggish White sister, which comes from Lakes Victoria and Albert Nyanza—brings down from the mountains of Abyssinia a tremendous torrent of water heavily charged with silt, and the last stages of the building of the Senaar dam constituted an exciting race with the 1925 flood. Nearly 20,000 men, half Sudanese and half Saidis from Upper Egypt, were engaged ; and, to beat the flood, work had to be carried on night and day : the great 2000 candle-power electric standards, reflected in the flooded river, made a weird and impressive spectacle in the desert. The Blue Nile was chosen in preference to the White because the Gezireh Plain—in former centuries the granary of the Sudan—slopes slightly from East to West ; and the site of the dam was fixed at Makwar, because there the bed of the river affords a hard, rocky foundation.

For nearly a generation the vast territory of the Sudan has been recovering gradually from the depopulation and devastation it suffered in the days of the Mahdi. Its recovery for many years was slow. But since 1919 its cotton production has trebled, and the Makwar Dam opens a fresh chapter. If the last and most ambitious portion of the Nile Commission's programme is ever carried out, and a barrage is constructed at the northern extremity of Lake Albert, a reservoir of unparalleled extent

A SECTION OF THE MAKWAR DAM

will be created, capable of supplying the needs of the remainder of the Sudan, and opening up vast possibilities for further cotton production.

Nyasaland promises well as a source of long-staple cotton of the American type (Nyasaland Upland). The largest development has been made in the southern part of the Shire Highlands, a name which vividly recalls Livingstone to the memory. The rainfall in Nyasaland is sufficient for cotton without irrigation.

Both Northern Rhodesia and Southern Rhodesia have shown that they can grow good cotton. Ginneries have been set up, and the native population is said to be taking kindly to the work.

In Uganda the prospects are good, in spite of the prevalence of thunderstorms which sometimes damage the crops. There is good water transport from Lake Victoria Nyanza, whence there is a railway to Mombasa, and now several metalled roads, suitable for motor wagons, have been constructed. It is significant that Uganda sends much of her raw cotton not to England but to India.

Nigeria, which at present itself uses much of its own cotton for the native cloths it sends all over Africa, is, however, the most promising area for producing large quantities of cotton of the type suitable for Lancashire. Although the yield per acre is low, and transport facilities are only mediocre, the possibilities of Nigeria are substantial.

Iraq (Mesopotamia) has climatic conditions similar to those of Lower Egypt, and an alluvial soil of great fertility ; here a long-staple American Upland cotton has been tried with considerable success. If the region could have a period of political stability for a time, then land tenure would be reasonably secure, and no doubt good schemes of irrigation would naturally follow. In that case the successful cultivation of good cotton would seem to be assured.

In many cotton regions—not in all—a continual war has to be waged against the ravages of the boll weevil, a beetle which in the larval stage is a vegetable feeder, and which does a great amount of damage by infesting the cotton boll. The Mexican

THE BOLL WEEVIL

Photograph from Ewing Galloway, N.Y.

boll weevil does an immense amount of damage in the cotton belt of the United States, and the pink boll weevil often infests the West Indian Islands. It has done great damage there, but by attention to seed disinfection and by other preventive measures the loss is not so great as at one time seemed likely. A pink boll weevil also gives much trouble in Egypt. Till recent times the greatest development of cotton-growing had taken place in sub-tropical regions, where the plant is an annual, destroyed by the frosts of winter. This annual killing off of the plant destroys also many of the pests to which it is subject. The recent development of cotton-growing in the British Empire is taking place, however, in regions within the tropics. Here there are no winter frosts to kill off the old plants, and if such killing off is found to be necessary for the destruction of the weevil and other pests, government action will be necessary to enforce it.

The question of the growing of cotton within the Empire was referred to the Empire Cotton Growing Committee, who issued their report—a valuable and interesting document, not too technical for the ordinary reader—in 1920. 'The problem', they state, 'of increasing the world's supply of cotton from the natural resources available in the British Empire is in no way insoluble. Good beginnings have already been made. Future developments may be confidently expected . . . if adequate funds are provided by the Imperial Government, the Colonial Governments, and the British Cotton Industry'.[1]

[1] *Report to the Board of Trade of the Empire Cotton Growing Committee*, 1920. [Cmd. 523. Price 1s. 6d. net.]

XI

THE ERA OF INTERNATIONAL COMPETITION

THE Lancashire cotton industry grew up almost without competition from abroad. Against the rest of the world the fortunate possessors of machines were in a position of monopoly. In 1783 the Manchester dyers were sending their pattern-cards all over Europe.[1] Ten years later English cottons were conquering the Leipzic and Frankfort Fairs, and in addition to the European market there was that of the United States. Lancashire's prosperity had been built up in a period unique in economic history, when the whole world went down on its knees and begged Lancashire to sell. The unique conditions enabled the self-made man, ignorant of theories but master of practical technique, to do enormous business and create vast industrial wealth. The export of yarn to the Continent both during and in the first years after the war was extensive enough to have its effect in contributing to the decline of the English weaver.[2] The Continental blockade hardly affected the Lancashire cotton

[1] *A Description of Manchester* in 1783: by 'A Native of the Town', p. 85. 'The younger dyers, who were not too much attached to the old processes, found sufficient employment for their invention, in the variety of patterns they were encouraged to produce for pattern-cards, which now begun to be circulated, not only in the King's dominions, but all over Europe; and the printing of many articles in the fustian branch gave a greater variety to these pattern-cards, while it gave a full scope to their invention, in dying grounds preparatory to most of them, and following the prints with other shades, till the art of printing here first rivalled that of London; and has now transferred that branch, in a great measure, from thence to the town of Manchester and its neighbourhood'.

[2] Guest, *History of the Cotton Manufacture.*

industry as a whole, so widespread and successful was the smuggling.

> 'Oh, Hood and Howe and Jervis
> Are masters of the main,
> Cornwallis sweeps the narrow seas
> And logs the weather-vane'.

The so-called spinning mills of Saxony were in reality only reeling mills—for reeling yarn spun in England. The mills of Lombardy produced little or nothing themselves: the justification for their existence was that they masked the importation of yarn from England. The value of the yarn smuggled yearly to France alone was between fifteen and twenty million francs.[1] For fifteen years after the Treaty of Vienna the lead, which England's insular position and premier place in the field of invention had given her, held firm; for the Continent required time to recover. England had, moreover, the advantage of her water transport, always far cheaper than transport by land, and developed her railway system earlier. On the Continent the development of railways began in Belgium and thence spread to France, but the movement only started two years after the Liverpool to Manchester line was a paying success.

By the time, however, Kinglake's Pasha was picturing the whole earth as covered with British calicoes[2] the period of Lancashire's monopoly was over, and the new era of international competition had dawned. Switzerland, with its water power and relatively damp climate, was competing with Manchester in Continental and Mediterranean markets. Cotton mills of considerable size, like Nageli's in Mulhouse, with 80,000 spindles, sprang up in Alsace. America, beginning to manufacture some of its own raw cotton, threatened the English markets in Brazil, Chili, and China. By 1836 it was estimated[3] that Europe and America together were manipulating 750,000 bales of cotton, which was about three-quarters of Britain's consumption.

The great Exhibition of 1851 stands as the outward sign that

[1] Ure, *Cotton Manufacture*, Introduction.
[2] See above, pages 213-4.
[3] Ure, *Cotton Manufacture*, Introduction.

England was conscious that a new era had begun. The Exhibition was planned by the Prince Consort, a man who knew the Continent. It was brought into being, in spite of all kinds of opposition, through his personal prestige. Representatives of

THE GREAT EXHIBITION, 1851

the world's industry were to be gathered into one great fair, and if the expectation of a new era of universal peace was quickly dissipated by a series of wars beginning with the Crimean and ending with the Franco-Prussian, the Exhibition yet fulfilled many of the golden expectations with which it was first welcomed, and left a fresher impression than any subsequent and greater Exhibition on the minds of all beholders, an impression

'like that of the boy's first visit to a play'.[1] It was divided into four main sections—raw materials, machinery, manufactured articles, and the arts. The Prince, speaking at the Mansion House banquet, which the Lord Mayor gave to the representatives of the cities and towns of the kingdom in order to enlist their support, said that the object was to 'give the world a true test, a living picture, of the point of industrial development at which the whole of mankind has arrived, and a new starting-point from which all nations will be able to direct their further exertions'. If it is not possible to point to any very tangible results, it must be admitted that the Exhibition justified itself. It not only covered its expenses, but left a large balance in the hands of the Royal Commissioners. All nations have since paid it the compliment of imitation; and it stands out as an industrial landmark. British industries learnt where they stood. British manufacturers realised that their monopoly was a thing of the past; that they were living in an age of international competition, where, as in the realm of the Red Queen in *Alice through the Looking Glass*, 'it takes all the running you can do to keep in the same place', and that, if they wanted to get somewhere else, they 'would have to learn to run at least twice as fast'.

The Lancashire cotton industry of to-day is the product of three factors:

(1) The inventions and developments consequent upon them.
(2) The removal of the more glaring evils of the new factory system, which, as soon as the Napoleonic War was over and the nation had leisure to turn its eyes inwards, became patent.
(3) The effects of the international competition which succeeded the comparative monopoly enjoyed during the earlier years, coupled with a stray lesson or two learnt from the Cotton Famine.

The first of these three factors has been dealt with in previous chapters. The second and third demand some notice.

[1] Cf. Justin M'Carthy, *A History of Our Own Times*, vol. ii. p. 103.

We have seen that the lowest point in the evil effects that attended the changes known as the Industrial Revolution came in the year 1837, the year of the accession of Queen Victoria. Mr. G. K. Chesterton speaks of two things as really making the Victorian Age, 'the cheapness and narrowness of its conscious formulæ; the richness and humanity of its unconscious tradition'.[1] The nineteenth century was indeed one of the world's spring-times. In spite of its clothes—not, after all, so much worse than the clothes of that great spring-time, the Renaissance—there was something springlike in the hearts of the men who emancipated the slave, passed laws for ill-treated animals, rekindled wavering Missions, developed schools, repealed the Combination Acts, sought to restrict the labour of children, and initiated the betterment of factories.

In 1776 Adam Smith had laid it down [2] that 'no society can surely be flourishing and happy, of which the far greater part of the members are poor and miserable', and taught that the liberal reward of labour increases the industry of the labourer. 'The wages of labour', he wrote, 'are the encouragement of industry, which, like every other human quality, improves in proportion to the encouragement it receives. A plentiful subsistence increases the bodily strength of the labourer. . . . . Where wages are high we shall always find the workmen more active, diligent, and expeditious than where they are low'. This teaching was new and took time to produce its effect. The idea then current was that most people only worked for a standard of living, and that if they could earn enough to attain that standard by four days' work they would not work for six days. The merchants of Manchester were only expressing the common view when they told Arthur Young, in 1771, that they preferred high food prices to low ones, because nothing but high food prices would keep the workman at his work. But opinion changed with the new century, in the first year of which Antony Ashley Cooper, afterwards the seventh Earl of Shaftesbury, was

[1] *The Victorian Age in Literature*, p. 31.
[2] *Wealth of Nations*, Book I, Chap. VIII, 'Of the Wages of Labour'.

born. Neglected by his parents, the little Ashley found in the fine old servant Maria Millis 'the best friend he ever had'; and it is not extravagant to attribute to her teaching not only the strict evangelical views he held, but their effective strength in enabling him to work as he did throughout his life for the poor and the neglected. Toiling at his vast correspondence without a secretary (he could not afford one, for even when he was a married man with eight children his father would only grant him the same allowance he had had as an undergraduate at Oxford) for more hours a day than the hardest-worked operative in the factories, he threw himself into the movement for the improvement of factory life, and the agitation for a Ten Hours' Bill, which began about 1831. In that year Michael Sadler, member for Newark, moved the second reading of the Bill, and the matter was referred to a Select Committee, over which he presided. But, unhappily, Sadler was pitted against Macaulay at Leeds in the General Election of 1832 and defeated, though an appeal was sent from Manchester signed by 40,000 factory workers. He died three years later. Other leaders of the movement were John Doherty, Secretary of the Cotton Spinners' Union; John Fielden, the master-spinner of Todmorden, and for many years member for the newly enfranchised borough of Oldham; Richard Oastler, popularly known as the 'factory king', whose portrait, with a child between his knees, adorned the walls of thousands of cottages in the textile districts; the Rev. G. S. Bull, Vicar of Bierley in Bradford; and that pioneer, John Wood, worsted spinner of Bradford, who not only educated his child-employés, but had baths for them, kept a resident doctor, and sent them to Buxton and Harrogate when they were run down. During all these years Ashley constantly visited the factory districts, procured the Calico Print Works Act, caused the appointment of the Children's Employment Commission, and pushed forward the movement for education. At the eleventh hour of the struggle for the Ten Hours' Bill his reputation suffered eclipse through his acceptance of a compromise. But the cloud passed. Bolton gave him a great welcome on his visit in 1851.

It was deserved. No man fought harder for the cotton workers than Ashley: when he died, he once declared, 'Lancashire' would be found written on his heart.[1]

The *Laissez faire*[2] system was, indeed, breaking down. Macaulay, who had, in 1830, trounced Southey for his regrets on the vanished Domestic System, and for seeing in everything connected with manufactures 'features of unqualified deformity',[3] said, in his speech on the Ten Hours' Bill in 1846: 'It must, then, be admitted that, where health is concerned, and where morality is concerned, the State is justified in interfering with the contracts of individuals. . . . Can any man who has read the evidence which is before us, can any man who has ever observed young people, can any man who remembers his own sensations when he was young, doubt that twelve hours a day of labour in a factory is too much for a lad of thirteen? . . . You try to frighten us by telling us that in some German factories the young work seventeen hours in the twenty-four . . . and you ask whether, if we pass this bill, we can possibly hold our own against such competition as this? Sir, I laugh at the thought of such competition. If ever we are forced to yield the foremost place among commercial nations, we shall yield it, not to a race of degenerate dwarfs, but to some people pre-eminently vigorous in body and mind. . . . We carried up on Monday last to the bar of the Lords a bill which will remove the most hateful and pernicious restriction that ever was laid on trade. Nothing can be more proper than to apply, in the same week, a remedy to a great evil of a directly opposite kind. As lawgivers we have two great faults to confess and to repair. We have done that which we ought not to have done. We have left undone that which we ought to have done. . . . We have prevented the labourer from buying his loaf where he could get it cheapest; but we have not prevented him from ruining his body and mind by premature and immoderate toil'.

[1] Cf. *Lord Shaftesbury*, by J. L. and Barbara Hammond.

[2] Cf. page 134 above.

[3] Cf. Macaulay's *Essays*: 'Southey's Colloquies on Society'.

Dickens poured ridicule on *Laissez faire*, in his own special manner, in his picture of the Gradgrind philosophy, in which everything was to be paid for. 'Nobody was ever to give anything or render help without purchase. Gratitude was to be abolished. Every inch of existence from birth to death was to be a bargain across the counter, and if we didn't get to heaven, it was not a politico-economical place, and we had no business there'.[1] Thomas Carlyle called *Laissez faire* a principle 'false, heretical, and damnable'. But Ruskin, who had studied political economy, dealt *Laissez faire* its deadliest blow in the essays called 'Unto this Last' (*i.e.* 'I will give unto this last as unto thee'). He wished to diminish the power of wealth, in the hands of one individual, over masses of men, and to distribute it through a chain of men, which would, he urged, give each subordinated person fair and sufficient means of rising in the social scale, if he should choose to use them; and thus would not only diminish the immediate power of wealth, but remove the worst disabilities of poverty.[2] The vital question, for individual and for nation, was never, he pleaded, 'how much do they make'? but 'to what purpose do they spend'?[3] Of Capital he wrote thus: 'Capital signifies "head, or source, or root material"—it is material by which some derivation or secondary good is produced. It is only capital proper (*caput vivum*, not *caput mortuum*) when it is thus producing something different from itself. It is a root, which does not enter into vital function till it produces something else than a root: namely, fruit. That fruit will in time again produce roots; and so all living capital issues in reproduction of capital; but capital which produces nothing but capital is only root producing root, bulb issuing in bulb, never in tulip; seed issuing in seed, never in bread. The

[1] Side by side with the influence of Dickens must, of course, be reckoned the services rendered by other novelists—by Disraeli, for example, in *Sybil* and *Coningsby* (which Peel's refusal to admit him to office in 1841 gave him both the opportunity and the incentive to write); and by Mrs. Gaskell, in *Mary Barton* and *North and South*.

[2] *Unto this Last*, §§ 51 and 52. [3] *Ibid.* § 72.

political economy of Europe has hitherto devoted itself wholly to the multiplication, or (less even) the aggregation, of bulbs. It never saw, nor conceived, such a thing as a tulip'.[1] The political economists Ruskin exposed were David Ricardo and John Stuart Mill. His essays, which first appeared in the 1860 *Cornhill*, and ' were reprobated in a violent manner ' (an excellent form of advertisement), were issued by him in book form eighteen months later, with the assertion that he believed them to be ' the best, that is to say, the truest, rightest-worded, and most serviceable things ' he had ever written.[2] When, in the following year, the third of the ' classical ' economists, Nassau William Senior, publicly withdrew at the Congress of Social Science at Edinburgh the views he had previously expressed, that a reduction of hours from twelve to ten would ruin the cotton industry,[3] and recommended the extension of the Ten Hours' Act to several other industries, the collapse of the old doctrinaire political economy was complete.

While writers and thinkers were denouncing the theory upon which the earlier factory system had grown up, and politicians were passing laws to remove the more glaring evils, the workers themselves, through their growing organisations, were preparing protective machinery for the future. The cotton workers were as early in the field as any; first with clubs, like the Oldham Friendly Associated Cotton Spinners of 1797, which were not without their convivial side ; and then, in 1829, attempting with the textile workers of Yorkshire and under the leadership of the John Doherty just mentioned, by the ' Grand General Union ' to include all workers in a single organisation.

The co-operative movement had its birth in Rochdale, where in 1844 a number of the workers formed a society, calling themselves " the Rochdale Pioneers." The movement was laughed at and dubbed " the weavers' dream," but it had come to stay and had its effect in consolidating the workers. First Oldham, then Manchester, Liverpool and Birmingham followed Rochdale's lead.

[1] *Ibid.* § 73. [2] *Ibid.* Preface.
[3] *Letters concerning the Factory Acts.*

But the real rise of modern Trade Unionism dates from the fifties, when the Amalgamated Society of Engineers was formed; and, in the cotton industry, the first great amalgamation of local unions took place by the formation of the Amalgamated Society of Operative Cotton Spinners; and a very able Junta, or inner cabinet of three,[1] directed Trade Union policy, always acting with courtesy and caution, and always endeavouring to promote peaceful settlements. In the Royal Commission of 1867 appointed to examine into the work of Trade Unions, Tom Hughes (author of *Tom Brown's School Days*) and Frederick Harrison, in their recommendations in the Minority Report, gave the Junta a valuable lead for future development. So far unskilled labour had been left out in the cold, but the Dock Strike of 1889 made good that defect and vindicated the ' New Unionism '. The influence of the new spirit was felt in the older craft unions, in which, in a series of unions following closely the operations of the trade, the cotton operatives were organised. The Amalgamated Association of Card and Blowing Room Operatives arose in 1886, and was followed some years later by the Amalgamated Weavers' Association. There were, of course, counter associations of employers, like the Master Cotton Spinners' Association; and the two sides, the operatives represented by James Mawdesley, secretary of the Spinners and one of the strongest men Lancashire has known, and the employers by Sir Charles Macara, had an historic encounter in 1893, when, after a six weeks' strike, at the Brooklands Hotel, on the Cheshire border of Manchester, the famous Brooklands Agreement was signed. It set up three courts —one of first instance and two of appeal, and provided that no dispute in a trade should go the length of a lock-out by the employers or a strike by the employed, till each of the three tribunals had tried to settle it, and failed. The Brooklands Agreement prevented any general stoppage in the trade for sixteen years; in 1910-11 it was allowed to lapse in favour of an Industrial Council. Perils beset all big organisations, be they of masters or men. Trade Unions have their drawbacks. They sometimes

[1] George Odger, Daniel Guile, and Edwin Coulson.

become tyrannical and exercise over their members restrictions far more irksome and severe than any imposed by employers. If abused, they may become anti-social factions, unscrupulous, anti-patriotic. But their record is on the whole an honourable one, and their reception as one of the necessary parts of the body politic has steadily grown more cordial. With the size and complexity of modern business concerns they would, indeed, seem a commercial necessity. If they did not exist it would be necessary to invent them.

While factory legislation and the Trade Unions were attacking the evils in the workshops, the Local Government Authorities, aided by the State, got to work upon the Augean stables of the new cities. Until the passing of the Municipalities Act of 1835, only corporate towns could obtain powers to effect improvements. There was plenty to do. Till 1828, when she had 140,000 inhabitants, Manchester had no paving or sewering Act. There was no building Act, so that, save in certain streets, protected by the Police Act, each proprietor could build as he chose. Public parks were non-existent. Land was valuable; the result was that it was economised, and both cellar residences and back-to-back houses became common. In 1834 it was estimated that 15,000 persons were living in cellars in Manchester. Dr. J. P. Kay (afterwards Sir J. P. Kay-Shuttleworth) described them thus:

> 'The condition of a very large proportion of these dwellings beneath the level of unsewered streets was to the last degree insalubrious—it was often pestilential. I have sometimes, as a dispensary physician, had to make my way to the bed of a patient suffering from typhus, by stepping from one brick to another, placed for my convenience on the flagged floor, which was covered with some inches of water. This occurred to me twice in Little Ireland, where on one of these occasions nearly a whole family perished of typhus. The cellars were inundated during a flood of the Medlock. It occurred also in "Irish Town", in the valley of the Irk; and, during the prevalence of cholera, I remember carrying away some bad cases in canvas slings on the shoulders of hospital bearers, from flooded cellars not far from Knott Mill'.

In the next thirty years these reproaches were wiped out. 1578 streets (equalling sixty miles) were paved and drained in Manchester alone, excluding Salford ; nearly 150 miles of sewers were laid. One and a-half million pounds were spent on improving the water supply. Three public parks of thirty acres each were provided in perpetuity for the use of the two boroughs. Both established free libraries and museums. The million pounds made as a profit on the gas works were spent in street improvements. Of the cellar dwellings 1100 were altered and 450 condemned.

What happened in Manchester was typical of other towns,[1] and side by side with such improvements education was being developed, and schools, baths, and other amenities were being provided. This raising of the standards of life and decency has continued, though there is some distance to march yet. The worker, moreover, has been enabled to enjoy greater peace of mind and security since unemployment pay and old age pensions have been arranged for by a system of national insurance. It has indeed been said that ' at no period in the history of mankind has the task of labour been so light, or its reward so large and generous '.[2] And yet we are not satisfied ! The reason is that, during the last hundred years, the stress of international competition has evolved a new kind of workman.

There is an Eastern proverb, ' the arch never sleeps '. In the thirties it was beginning to dawn upon the most watchful that a condition of sleeplessness was being imposed upon the Lancashire cotton industry, with one of its piers resting on the Western hemisphere, whence it drew its raw material, and the other on

[1] Oldham, for example, obtained its charter of Incorporation in 1849, and its first act was to create a Police Force, which consisted of a superintendent, a sergeant, and two constables. Rochdale's municipal charter dates from 1856 ; its first mayor was Jacob Bright, younger brother of John Bright.

[2] Richard Marsden, in his Introduction to Dr. G. von Schulze-Gaevernitz' *The Cotton Trade in England and on the Continent.*

MANCHESTER IN 1834
From an engraving of that year

the Eastern, where it sold the finished product; for, in addition to its permanent burdens, every change of wind and weather racked it with some new and unexpected thrust. Up to the present we have been beholding, in the cotton industry, the parent of all mechanical industries. Since 1830 it shows us more: the story of cotton in Lancashire in these ninety years is a microcosm of the trading history of the nineteenth century.

The first effect of international competition was to compel England to reduce the costs of production. The most obvious way to do this was by concentration. It has been seen in Chapter VII (iii.) above how this concentration was brought about geographically. But the concentration involved more than a concentration of the series of operations properly belonging to the cotton manufacture itself. Allied trades were attracted into it. Arkwright, like all the manufacturers of his day, had constructed his own machinery. It was made largely of wood, and splendid stuff it was: like some old oak-built man-of-war in days of iron, the wooden machinery at Cromford was turning out as fine counts, and the wooden cogs of its wheels fitting together as truly, in 1836 as in 1772. The carpenter was also a necessary factor in the early steam-engines: beams of wood were used for the cranks. Laying the foundation stone of the Public Baths at Stalybridge, Mr. Robert Platt recalled the setting up of the first rough, uncouth six-horse-power steam-engine in 1796 at Messrs. Hall's mill there, and how the beam was just a square log of Baltic timber. 'Many and many a time', he mused, 'when I was a little boy have I ridden on that old beam'.[1] The carpenter, too, before the days of iron girders, had to solve the problem of constructing floors capable of withstanding the strain of the new steam-driven machinery. The 'Native of the Town', who has left us a *Description of Manchester* in 1783, explains how it was done. 'Opposite the almshouses in Miller's Lane', he tells us, 'is a firm built and capital engine-house, in which the floor beams are all made to spring against their own

[1] Samuel Hill, *Bygone Stalybridge*, p. 47.

length and the incumbent weight, by first sawing strong deal balks through the middle, and letting in oak spars to spurn at obtuse angles upward, the divided balks being then screwed together with iron pins, so as to resist the pressure above. Here it is that Mr. Arkwright's machines are setting to work by a

CRANK MILL, MORLEY, YORKSHIRE

steam engine for carding and spinning of cotton. . . .'[1] But this sort of thing took too much time in an era of competition. Not only was it too expensive to make or fit one's own machinery, but it was seen that if factories were scattered and small, there had to be many repair shops, and every manufacturer had to be heavily equipped with spare parts which ten to one would

[1] The reader should, for a moment, contrast this 'engine house' in his mind with the mighty six-storey Swan Lane Mill at Bolton.

never be needed, and which quickly got out of date.[1] So there grew up the, now highly specialised, industry of making cotton machinery. One of the pioneer firms can date its origin back to 1790, when Isaac Dobson of Patterdale came and settled in Bolton, and commenced the manufacture of spinning machinery; the firm is, of course, well known to-day under the name of Dobson and Barlow, of Bolton. Since those early days a great specialised industry has grown up, making machinery not only for the Lancashire cotton region, but large quantities for export to all parts of the world where spinning and weaving are done. This industry is located in the heart of the cotton district, but makers of many special kinds of textile machines are found scattered over the whole region. Visitors to the Empire Exhibition at Wembley saw an example of these highly specialised machines in the engineering part of the Exhibition; this was a stupendous sizing and drying and warping machine made by the firm of Howard & Bullough of Accrington. Textile machinery of some kind is made in every cotton town in Lancashire; Manchester, Stockport, Ashton, Oldham,[2] Rochdale, Bury, Preston, Blackburn, Accrington, Burnley, and Colne have engineering works which are known wherever textiles are made. Some of these towns have vast concerns in which thousands of workmen are employed, but, on the other hand, there are still to be found small

[1] Cf. Robert Owen's account of the New Lanark Mills under his managership. 'We had iron- and brass-founders, forgers, turners in wood and iron, machine makers, and builders in all branches, having continually buildings to repair and erect and machinery on a large scale to repair and renew. The annual repairs alone of the establishment cost at this period upwards of eight thousand pounds'. *Life of Robert Owen*, by Himself, p. 187.

[2] The textile machinery in Oldham was started the year after Waterloo by Samuel Lees, who began to make rollers at Greenacres in a cottage which he called Soho Works. His son, Asa Lees, founded in 1845 the firm now known locally as "Asa's." The great firm of "Platts" began in 1824 with five workmen. The earliest firm of machinists in Stalybridge was "Hartley and Woodcock," who made about 1801 in "Old Jenny Booth's garret" jennies of "the enormous size of 20 dozens."

textile machinists employing less than a dozen men. The textile engineering trade is one of the three great industries of Burnley, for example, and though there is no great works employing its thousands of artisans, it is claimed that Burnley produces more looms than any other town in the world.

It would be quite impossible even to mention all the varied kinds of subsidiary machines used in the Cotton Industry. In later days machines for knotting yarn, for cleaning yarn, for stripping the roller leathers, and for stripping the spinners' cards have called for that inventive skill which is characteristic of the Cotton Province. The Vacuum Card stripper—acting somewhat on the same principle as the household carpet cleaner—may be quoted as one example out of many. It helps to secure that cleanliness in the factory together with the prevention of waste, both of which are necessary in the modern highly developed industry.

It will be readily understood, too, that there is a special branch of the chemical industry which concerns itself with the needs of the cotton trade. Acids, alkalies, dyes, and mordants are used in enormous quantities; and textile soaps, special gums and waxes, tallow and other fats, starch and farina, are other substances for which there is a great demand. All these are made or prepared for use in the South and East Lancashire districts.

The wheel of concentration has drawn in other industries, dependent, in greater or less degree, upon the cotton industry. One of these industries is the making of various kinds of felt, which are made in the Rochdale, Bury, and Rossendale districts, where the woollen industry has long been a staple trade, and both short staple and waste wool and cotton are used in different proportions in some of the felts made in that district. Probably an immediate outcome of this felt manufacture is the flourishing slipper industry of the Rossendale Valley; this is now an industry of the first rank in Bacup, Waterfoot, and Rawtenstall, and there are also slipper-making factories in some of the other towns of that immediate district.

The Clothing Industry in various forms has assumed considerable

proportions, especially in Manchester—the great central region of the cotton and allied industries—and there are also many other branches of the clothing manufacture, more especially of underclothing, in Wigan, Bolton, and Burnley. In the district of North Manchester and Pendleton the making of waterproof cloths is done on a great scale, both that which is done by the old Mackintosh process and the modern light coats, which are mostly made from gaberdine cloths treated by chemical processes. These processes aim at depositing insoluble, neutral compounds among the fibres of the cloth, and by that means, and a special mechanical finish, the cloth is made showerproof. This is one of the most interesting developments of recent times arising out of the cotton trade and its immediate applications.

Cotton is also used in large quantities in the manufacture of motor tyres, good American and Egyptian cotton being required for this purpose.

In the early days of cotton the warp was always of wool or linen or silk ; cotton was only good enough for the weft in those times. Now cotton warp can be made to stand a considerable strain, and mixed fabrics are frequently made with cotton warp and worsted weft. One of the writers has woven thousands of yards of cloth in which the warp was of high-grade American or good Egyptian cotton yarn and the weft was worsted. The weave was a plain one of two shafts, with about sixty warp threads and sixty weft threads per inch. These goods were first bleached and then dyed, and after finishing went to the warehouse as dress fabrics. Such mixed fabrics are quite common in the textile industry.

Silk, worsted, linen, and even ramie, all find their way into some of the mixed fabrics of the Lancashire and District Textile Trade, and now a later comer seems likely to play a very important part in the textile world of the future. This is the fibre, or perhaps we should say group of fibres, known by the general name of Cellulose Silk, Artificial Silk or Rayon. These fibres are made from wood pulp, paper, and cotton waste chiefly, by a remarkable series of chemical processes. Their glossy appearance

and the ease with which they may be dyed in delicate and beautiful shades are qualities in their favour. Against them is the charge that they will not stand washing so well as the natural fibres, but very considerable improvement has recently taken place in this respect. These fibres are mixed in various proportions and in a great variety of ways with the natural

NORTHROP LOOMS

fibres, and there would seem to be great possibilities in store for these latest arrivals in the textile world.

In addition to a geographical concentration of machinery designed to develop a particular process of the manufacture, there took place a concentration in the machines themselves. They showed a tendency to grow longer, more efficient, technically more perfect. In the machine-breaking riots of 1779 only machines with more than twenty spindles were broken. In 1835, when Baines wrote his *History of the Cotton Industry*, though 500

or 600 spindles were ordinary, machines with 1,000 were not unknown. To-day in Oldham or Bolton one would not be surprised at machines with 2,500. There was at the same time an increase in the speed of the revolutions. Machines of the new speed capacity not only were not fit subjects for children, but they required men of different calibre from the poorly paid, under-fed workpeople who had worked their prototypes. Concentration, in the field of machinery, demanded bigger, speedier, better machines, and more efficient, better-paid men, who were able to work shorter hours because of the faster speed and greater output of their instruments. In this matter of machinery, as elsewhere, constant vigilance is demanded: here too the arch of the cotton industry never sleeps. Lancashire found it could not get on without the 'Heilmann' comber, invented in Alsace in 1845. The ring frame had its birth in America; and James H. Northrop, who invented the Northrop loom in 1888, was a naturalised American, though born in Keighley. In 1911 we had only 6,000 automatic looms as against the 200,000 in the United States, and though England has made up some of her leeway, the story of the automatic loom but typifies how fast one must run in cotton-land even to keep in the same place.[1]

In transport, as elsewhere, the contrasts are great since the days when strings of pack-horses were the only goods trains, and in sea carriage to the East the custom of the captain freighting his ship on his own account was still an actual experience. The dilatoriness and uncertainty of shipment caused 'Ready-money Jack' (John Leech, 1801-1861, of Stalybridge) and others like him, to maintain fleets of their own. The names of two of 'Ready-money Jack's' ships have come down to us, the *Jane Leech*, 871 tons, and the *Shuttle*, 365 tons.[2] But the Atlantic cable, forced through by the indomitable conviction and persistence of Cyrus W. Field,[3] and other cables, such wonders as

[1] Cf. Gray and Turner, *Eclipse or Empire?* J. Thorp, an Englishman, and Jencks, of Rhode Island, are variously claimed to have invented the Ring Frame.

[2] Cf. Samuel Hill, *Byegone Stalybridge*, pp. 224 *seq.*

[3] Cf. Justin M'Carthy, *History of Our Own Times*, vol. iv. p. 89 *seq.*

the Suez Canal, and an Air service from Manchester to nearly every part of the globe, have come in turn since. It was fitting that the completion of the Atlantic cable, which brought Liverpool nearer to America than it had once been to Manchester, should have taken place when a Lancashire man, the Earl of

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Derby, was Premier, and that his son, Lord Stanley, should, as Foreign Minister, have been the official recipient of the intimation.

Changes in transport and in means of communication affect modes of buying and selling, which international competition naturally tends to develop and sharpen. So long as the English manufacturer had been in a position of monopoly he did not need to trouble about a highly developed organisation for the

sale of his goods. His market stood founded on the surest of all commercial rocks—economical superiority. But expansion and competition brought many changes. In the thirties the Liverpool cotton importer imported cotton not at his own risk, but on commission for the Americans. Before the fifties this gentleman gave way to the real importer, importing cotton at his own risk. The link with the spinner was the inland merchant, who had his office in Manchester ; and as trade expanded and became more complex there arose the buying and selling brokers, whose functions, governed by a host of unwritten laws, interposed, as it were, two convenient buffer-states between the importer and the merchant. But, strange to say, far less progress was made in organising the sale of the manufactured article. For the home market the manufacturer still relied upon the commercial traveller —Richard Cobden began life as one ; for foreign markets, on the agent : that is to say, he himself remained saddled with all the risks, bound to try to keep in touch with fluctuations of markets and prices, and to follow political crises all over the world, in addition to looking after the inside progress and development of his mill. Now all this is changed. The agent of the thirties has developed into the wholesale merchant, one of the most important factors in the trade, a buyer for himself, on whose shoulders now rest the risks once borne by the manufacturer. In Manchester much of the distributing business fell into the hands of Scotsmen, many of whom, like the Bannermans, migrated southwards at the beginning of last century. The German agents of the eighteenth century likewise became the German residents of the nineteenth. The break-up of the Turkey Company in 1825 introduced the Greeks, who were followed by the Armenians ; so that Manchester, like the head city of the parent woollen industry, Bradford, has become cosmopolitan, a city of merchants, with a foreign and ' outlandish ' flavour about her, in striking contrast to the proud provinciality of Oldham.[1] But while competition demands increasing watchfulness and greater division of labour, modern improvements in communication have

[1] Cf. W. Haslam Mills, *Sir Charles Macara, Bart.*, p. 51.

lessened the risks of the market by bringing the countries of the world nearer to one another. One of the developments thus rendered possible is the business in 'futures', whereby the importer of cotton, foreseeing, like Joseph of old, fat years and lean years, buys cotton before it is sown and sells it before it is ginned, maintaining by such speculative transactions an equality of price undreamed of before the sixties.

The Americans have a slogan,

> 'Early to bed, early to rise;
> You'll bust if you don't advertise'.

Had the last word been 'organise' instead of 'advertise', one might have supposed the lines to be a slogan of the Lancashire cotton industry in the days of international competition. The point which the possibilities of organisation had reached was demonstrated when the great European War broke out in 1914. In the Woollen and Worsted Industry a Control Board was appointed, for on this industry lay the responsibility of clothing not only our own army, but of helping to clothe the armies of our allies. The problem in the highly organised and localised cotton industry was different—a problem not of supplying government needs, but of preventing a serious crisis through stoppage of work owing to shortage of raw material, such as had occurred during the Cotton Famine. The crisis came in 1917, when the submarine war reached its most menacing stage, and, with an ever-growing list of needs, the Ministry of Shipping had to arrange the nation's tonnage with a constantly decreasing supply of ships. There was a military demand for certain kinds of cotton goods, and a certain amount of cotton was required for explosives—though this, of course, did not affect the spindles of Lancashire. For the rest, cotton had to be ranked second to such necessities as food and munitions, which the population and the army could not do without.[1] On 20th June, 1917, the

[1] Cf. on all this question, Hubert D. Henderson: *The Cotton Control Board* (Economic and Social History of the World War Series), Clarendon Press, 1922.

Government temporarily closed the Liverpool Cotton Exchange. Prices of American cotton were fixed from day to day at a figure that allowed the broker reasonable profit. Eight days later the Board of Trade appointed a Cotton Control Board, under the chairmanship of Sir Herbert Dixon. The plan adopted was to limit, not the amount of cotton purchased, but the output of the various mills; and to do so not by enforcing short time, but by limiting the percentage of machinery that might be used, and arranging for unemployment benefits for those thrown out of work by compulsory levies on employers. The spinners of American crops were tied down to the use of only a proportion of their spindles; those—mainly in the Bolton district—who used Egyptian, of which there was a good supply, were not restricted; but they had, in fairness, to pay a levy on the percentage of spindles they had running in excess of the percentage running in the mills where only American cotton was spun. In weaving, a similar levy was imposed on those manufacturers who used more than 60 per cent. of their looms—the demarcation between American and Egyptian is not nearly so sharp in weaving as in spinning—and both levies went to furnish a fund for maintaining those, whether Trade Unionists or not, who were thrown out of employment by these measures. This fund was administered by the Trade Unions. Short time, avoided so far, had to be resorted to in June, 1918, when after the German Offensive the supply of raw cotton was further reduced, and the restrictions on the use of machinery had to be supplemented. It was a situation that might have revived memories of the Cotton Famine. But there was neither ruin nor confusion. Each business was rejoiced to find its own relative status and position in regard to others maintained.[1]

The plan of the levies deserves notice, inasmuch as it might be applied to an emergency that was not a war emergency. It is based on the recognition of three important things: (1) the essential unity of the cotton industry, (2) the moral responsibility of the industry itself for all engaged in it, and (3) the claims of

[1] Cf. Hubert D. Henderson: *The Cotton Control Board*, p. 26.

the Trade Unions to be the authorities for administering unemployment benefit.[1] The plan, moreover, demonstrated to conclusion that, when employers and employed had properly constituted bodies to represent them, a thing they had not in the troubled days of the Industrial Revolution, it was possible for the Government to intervene effectively to secure the equitable interests of both.

The Cotton Control Board was a success. Lancashire was proud of it.[2] Such quarrels as there were, including a Spinners' Strike that lasted a week, were family quarrels : the Board never lost the goodwill of the operatives. The Inquiry Tribunal appointed to investigate the grievances of the spinners attested this. ' We were struck ', they reported, ' by the warm tributes paid by the men's representatives to the success with which the Board are performing their very difficult task '.

But the final and most important product of international competition was a new type of man. The early recruits of the cotton industry had been small farmers, compelled through changes in agriculture to give up their farms, cottage workers left destitute through the failing demand for their labour, discharged and disabled soldiers, Irish emigrants, workhouse children. Their weakness lay in the fact that the new centralised industry was in the strong position of a monopoly in regard to the declining, scattered domestic industry, which they were perforce abandoning.[3] But to these unfortunate and hardly-used victims of an industrial revolution there succeeded generations born to the machine ; while, accelerating the movement, came international competition with its lesson that economical success could only

[1] *E.g.* For a time the Egyptian spinners were called upon to provide the bulk of the levies ; and Sir Herbert Dixon, Chairman of the Board, was himself an Egyptian spinner.

[2] *Ibid.* pp. 62 and 69.

[3] There were, of course, fortunate workers even in those days. About 1770 the weavers of Stalybridge carried canes when they walked abroad, wore top-boots, and at their meetings at the village inn smoked none but churchwarden pipes.

come by increasing the output of work per man, or reducing the number of workers in comparison with the work accomplished. That minute division of labour which at first threatened to turn the worker himself into a tool was transferred to the new machines, the handling and humouring of which (for no two outwardly identical machines are in reality alike ; one must understand their whims and their moods to get the best results from each) demanded mental in the place of muscular strain. And the growing complexity of machinery, demanding understanding and intelligent handling, imposed on the operative a greater responsibility. If hours have become shorter, it would be rash to conclude that labour has become lighter.

The call for intelligence, dexterity, and ability to assume responsibility has wrought a psychological change in the worker, and produced a new type of man. Not only has this man, with his piano, his wireless, and his annual holiday at Blackpool or elsewhere (for already his widening vision is leading him further afield), a greater *joie de vivre* than his predecessor and a higher standard of living, but he has inevitably begun to follow in the steps trodden several centuries since by the merchant, and one century since by the manufacturer. Each of these in turn saw his horizon extend : he saw his profits making possible to him the enjoyment of all the achievements of art and culture. The temptation was overwhelming : first the merchant, then the manufacturer, fell under its spell and obeyed its inexorable law—the law of wanting more and ever more, and of demanding, in consequence, from one's work the greatest possible profit. The Lancashire cotton worker of to-day has in his turn beheld the vision ; and the expansion of his life is at once the measure and the guarantee of the increase in his labour-capacity. He is the new type of workman.

And with the new type of man is surely coming a new type of town. Dickens, in his picture of Coketown, has shown us the old type—' a town of machinery and tall chimneys, out of which interminable serpents of smoke trailed themselves for ever and ever and never got uncoiled. . . . You saw nothing in Coketown

but what was severely workful. If the members of religious persuasion built a chapel there—as members of eighteen religious persuasions had done—they made it a pious warehouse of red brick. . . . The gaol might have been the infirmary, the infirmary might have been the gaol, the Town-hall might have been either, or both, or anything else, for anything that appeared to the contrary in the graces of their construction. Fact, fact, fact, everywhere in the material aspect of the town ; fact, fact, fact, everywhere in the immaterial '. All this has well-nigh gone but the coke. And, if Mr. Baldwin's electricity scheme is allowed to go forward, in another decade most of the cotton mills will be driven by electricity, which can be switched on and off at pleasure. Such a change would not only at once render unnecessary much of the rigidity of the present hours, but would lift those dark clouds of smoke and enable the cotton workers once more to behold, like their fathers before them, the blue skies and green fields that are indelibly associated with a ' Merrie England '.

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